

Self-Generation Incentive Program





Self-Generation Incentive Program (SGIP) Heat Pump Water Heater (HPWH) Workshop – Part 2

May 7, 2020

California Public Utilities Commission (CPUC)

**Nora Hawkins & Nate Kinsey
CPUC Energy Division**





WebEx and Call-In Information

WebEx:

<https://cpuc.webex.com/cpuc/onstage/g.php?MTID=e3640a4c370dbe376cbccb176f68129b2>

Recommend using audio through your computer if possible.

Call-in: +[1-415-655-0002](tel:14156550002) (please note this number has tolls)

Meeting number (access code): 262 559 154

All participants in listen-only mode by default.

Please submit questions/comments via the WebEx chat and/or use the “raise hand” function.





Ground Rules

- State your name and organization at start of your comment or question.
- Keep comments focused on the agenda topic being discussed.
- If you are unmuted, please try to keep noises around you to a minimum.
- If you are only participating via phone and you have a question, please email it to: Asal.Esfahani@cpuc.ca.gov





Recent CPUC Decisions on SGIP

(HPWH explicitly brought into SGIP as thermal energy storage technologies)

- Decision 19-08-001 adopted on August 1, 2019
 - “GHG Decision”
 - Modifies program rules to ensure energy storage systems reduce greenhouse gases (GHGs) emissions
- Decision 19-09-027 adopted on September 12, 2019
 - “Equity Resiliency Decision”
 - Created a \$4 million budget to fund heat pump water heaters (HPWH) for equity customers
- Decision 20-01-021 adopted on January 16, 2020
 - “SB 700 Decision”
 - Adopts an annual funding level of \$166 million for 2020 through 2024
 - Added an additional \$40.7 million for “general market” HPWH incentives





Workshop Objectives

- **D.19-09-027:** “ The HPWH workshop should seek to address these priority questions raised by parties in their comments including:
 - Achieving market transformation of HPWHs;
 - HPWH incentive design;
 - Administration of SGIP incentives;
 - Achieving equity in HPWH deployment;
 - Ensuring load shifting;
 - Future allocation of SGIP incentives; and,
 - Coordination with other Commission programs.”
- **D.20-01-021:**“HPWH deployment may provide GHG reductions that significantly exceed the five-kilogram carbon dioxide per kWh(kg CO₂/kWh) required for storage system by this Commission in the GHG Decision. . . this workshop will consider whether SGIP should require use of controls to ensure HPWH re-heating off-peak.”





Part 1 Workshop Recap

- **Held via webinar on March 19, 2020**
 - Slides available at: <https://www.cpuc.ca.gov/sgip/>
- **Topics covered:**
 - Building Decarbonization and other HPWH programs;
 - Nate Kinsey, CPUC Energy Division
 - SGIP Overview
 - Rosie Magana, Southern California Gas
 - HPWH Basics: Technologies and Control Options
 - Pierre Delforge, NRDC
 - SGIP HPWH Program Design Principles and early draft straw proposal
 - HPWH Working Group: Building Decarbonization Coalition, NRDC, Sierra Club/EarthJustice, AO Smith Water Heating.

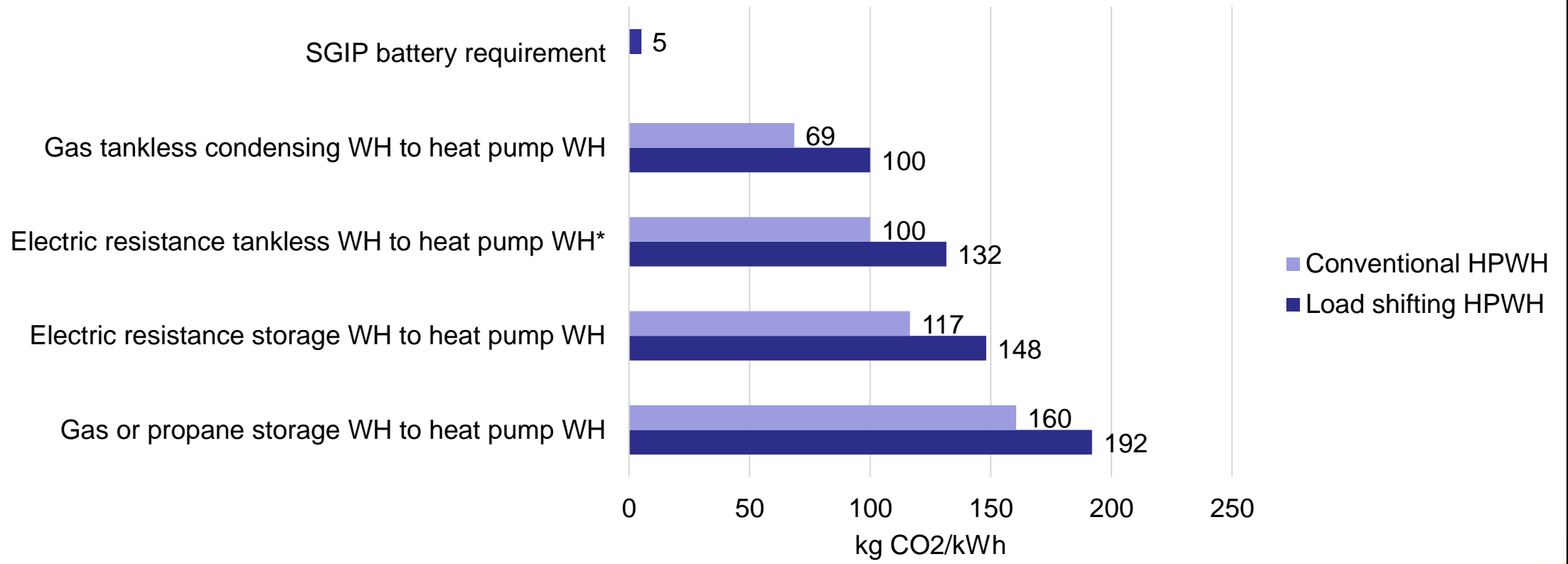




Part 1 Workshop Update

GHG Reductions by Type of Water Heater (WH)

Pierre Delforge, NRDC



* Electric resistance tankless is a proxy for emissions reductions by heating water via a HPWH vs. heating water at the time of consumption as tankless water heaters do.





Today's Part II Workshop:

WORKSHOP AGENDA

- | | |
|-------------------|---|
| 9:00am – 9:10am | Welcome, Safety, Introductions, Objectives and Scope Energy Division (ED) Staff |
| 9:10am – 9:30am | Market Transformation and Current Barriers Panama Bartholomy, BDC |
| 9:30am – 10:10am | Unitary & Central HPWH Case Studies Mike Corbett & Brett <u>Korven</u> , SMUD & Nick <u>Dirr</u> , AEA |
| 10:10am – 10:30am | Incorporating Equity into the SGIP HPWH Program Elise Hunter, GRID Alternatives |

Break (15 minutes)

- | | |
|-------------------|--|
| 10:45am – 11:00am | Straw Proposal Design Principles HPWH Working Group ¹ & ED Staff |
| 11:00am – 11:45am | Straw Proposal Incentive Structure & Value HPWH Working Group & ED Staff |
| 11:45am – 12:15pm | Straw Proposal Application & Verification Process HPWH Working Group & ED Staff |
| 12:15pm – 12:30pm | SoCalGas HPWH Program Concept Jason Legner & Blaine Waymire, SCG |
| 12:30pm – 1:00pm | SGIP HPWH Q&A and Open Discussion Energy Division Staff |





Guiding Principles for Workshop Dialogue

- Shared goal of determining the most effective and least administratively burdensome way to support HPWHs through SGIP.
- Conversation needs to focus on how HPWH deployment will align with SGIP's statutory mandate to improve efficiency and reliability of the distribution and transmission system, and reduce emissions of GHGs, peak demand, and ratepayer costs (Public Utilities Code §379.6).
- Consensus need not be reached today. CPUC will ultimately issue a staff proposal for comment.





SGIP Resources

- Statewide program page: <https://www.selfgenca.com/>
- CPUC Docket for recent decisions in Docket R.12-11-005: <https://apps.cpuc.ca.gov/apex/f?p=401:1:0>
- CPUC point of contact:
 - Nora Hawkins, SGIP Analyst in the Energy Division
 - Email: Nora.Hawkins@cpuc.ca.gov



Self-Generation Incentive Program



*Pacific Gas and
Electric Company®*



Center for
Sustainable
Energy™



A  Sempra Energy utility®



SoCalGas

A  Sempra Energy utility®



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Market Transformation and Current Barriers

PANAMA BARTHOLOMY

Director, Building Decarbonization Coalition

California's Climate Goals

By 2030

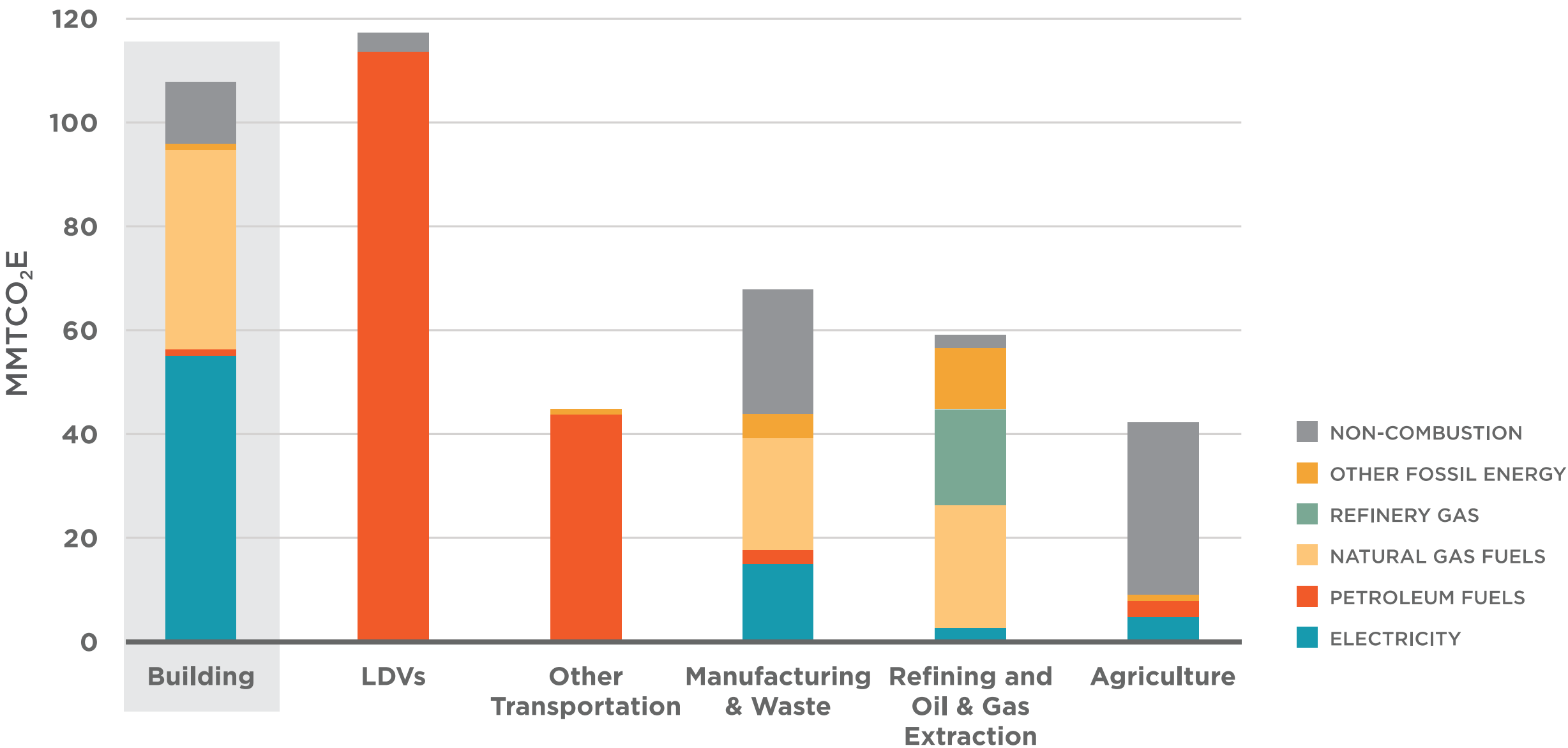
40% below 1990 levels (*SB 32, 2015*)

By 2045

100% zero-carbon electricity (*SB 100*) &
carbon neutral economy-wide (EO B-55-18)



California's GHG emissions today – Buildings 24%

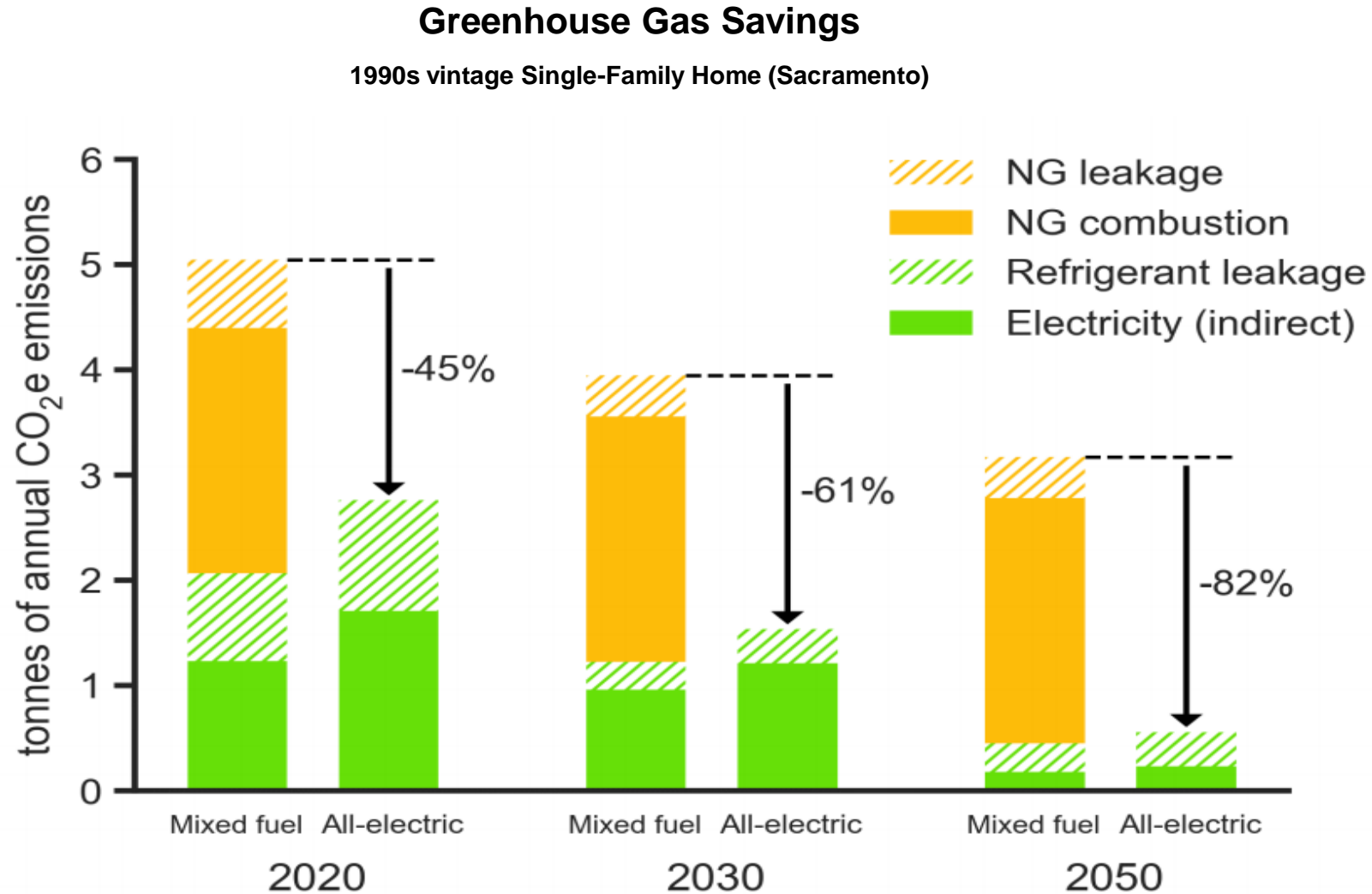


2018 Integrated Energy Policy Report

The Case for Building Electrification

There is a growing consensus that building electrification is the most viable and predictable path to zero-emission buildings. This consensus is due to the availability of off-the-shelf, highly efficient electric technologies (such as heat pumps) and the continued reduction of emission intensities in the electricity sector.

Up to 60% GHG emission reductions can be achieved in the near term by electrifying a whole home in California



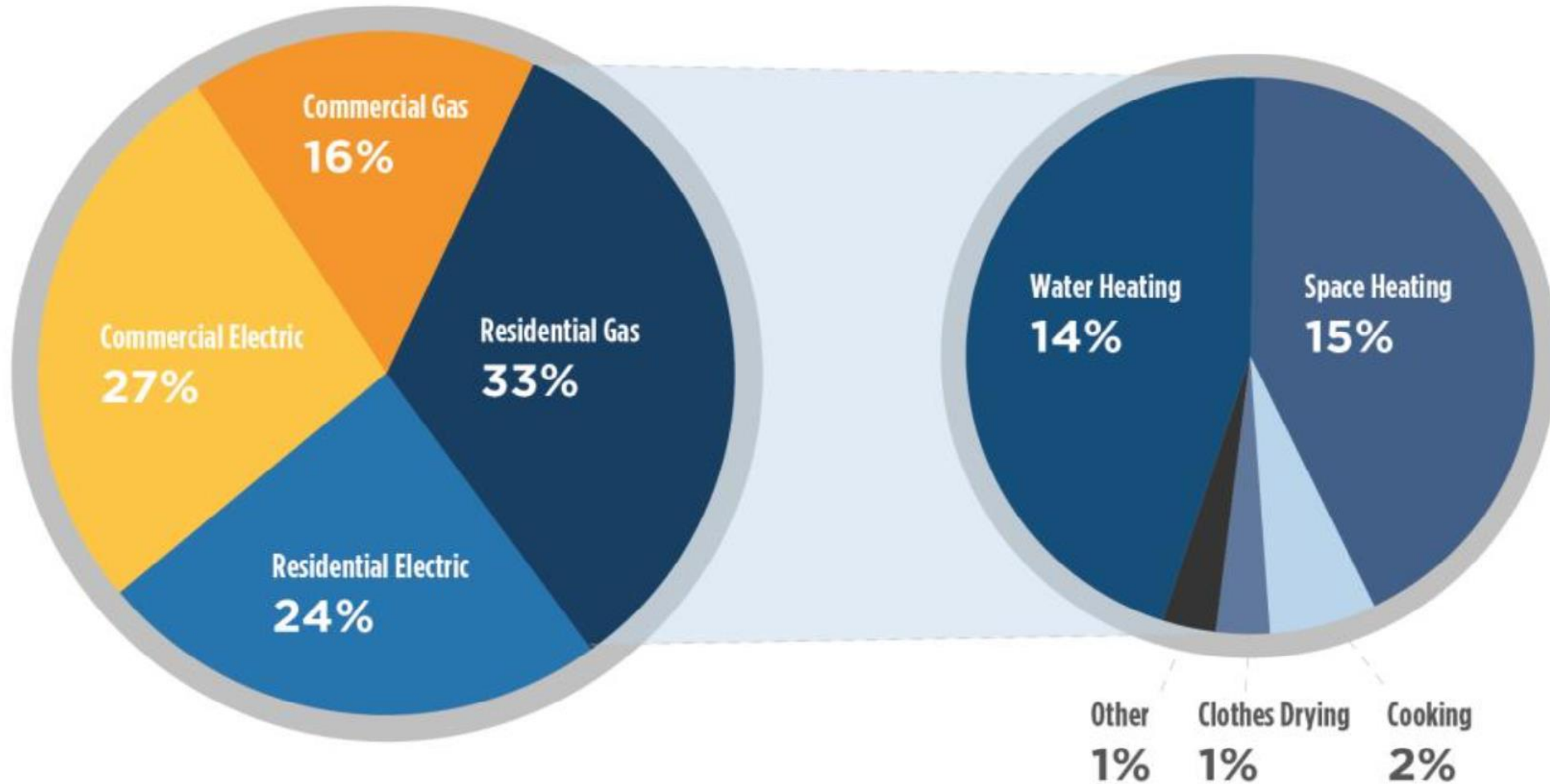
Source: E3 report on "Residential Building Electrification in California" April 2019.

California prepares to shift away from natural gas, while keeping power reliable and affordable

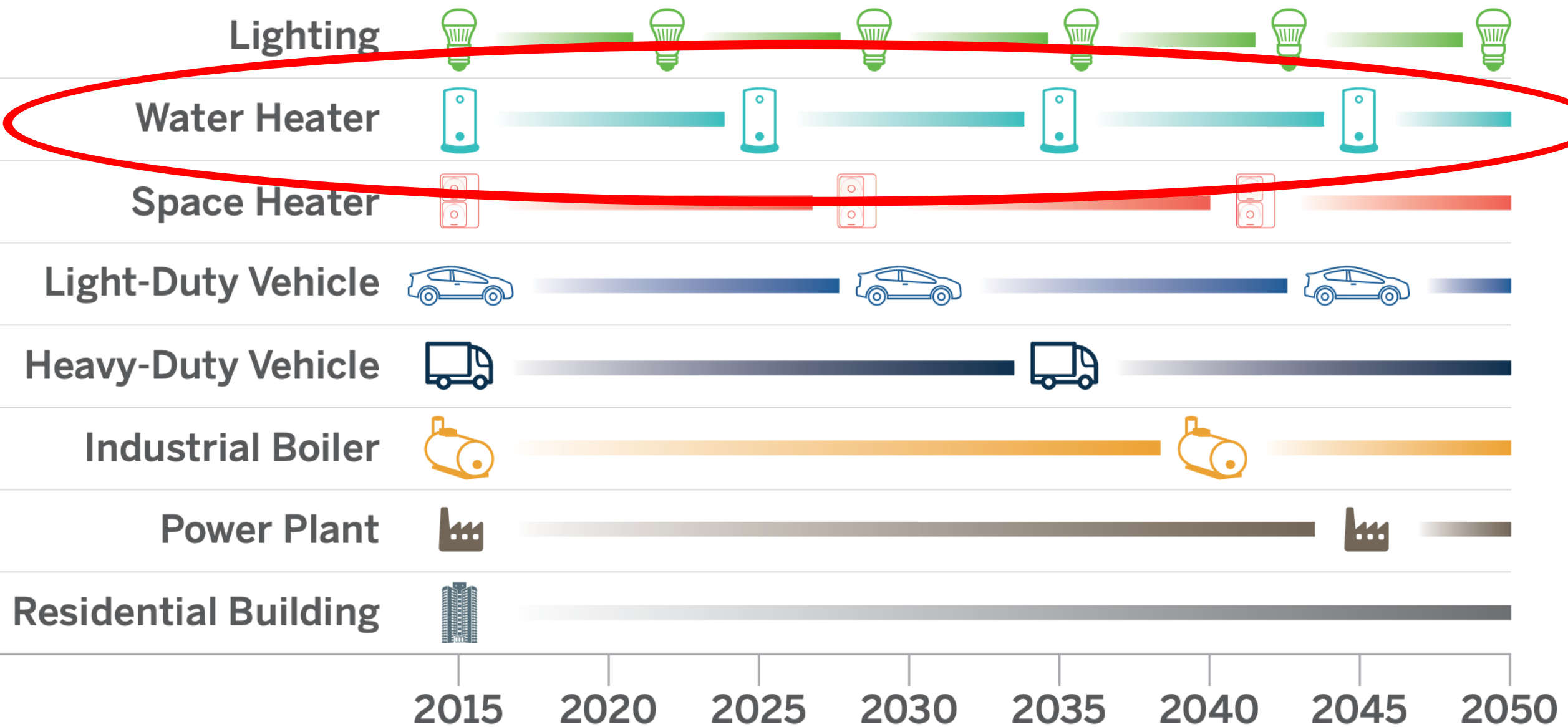


By Liane Randolph, Special to CalMatters

Energy Use in California Buildings

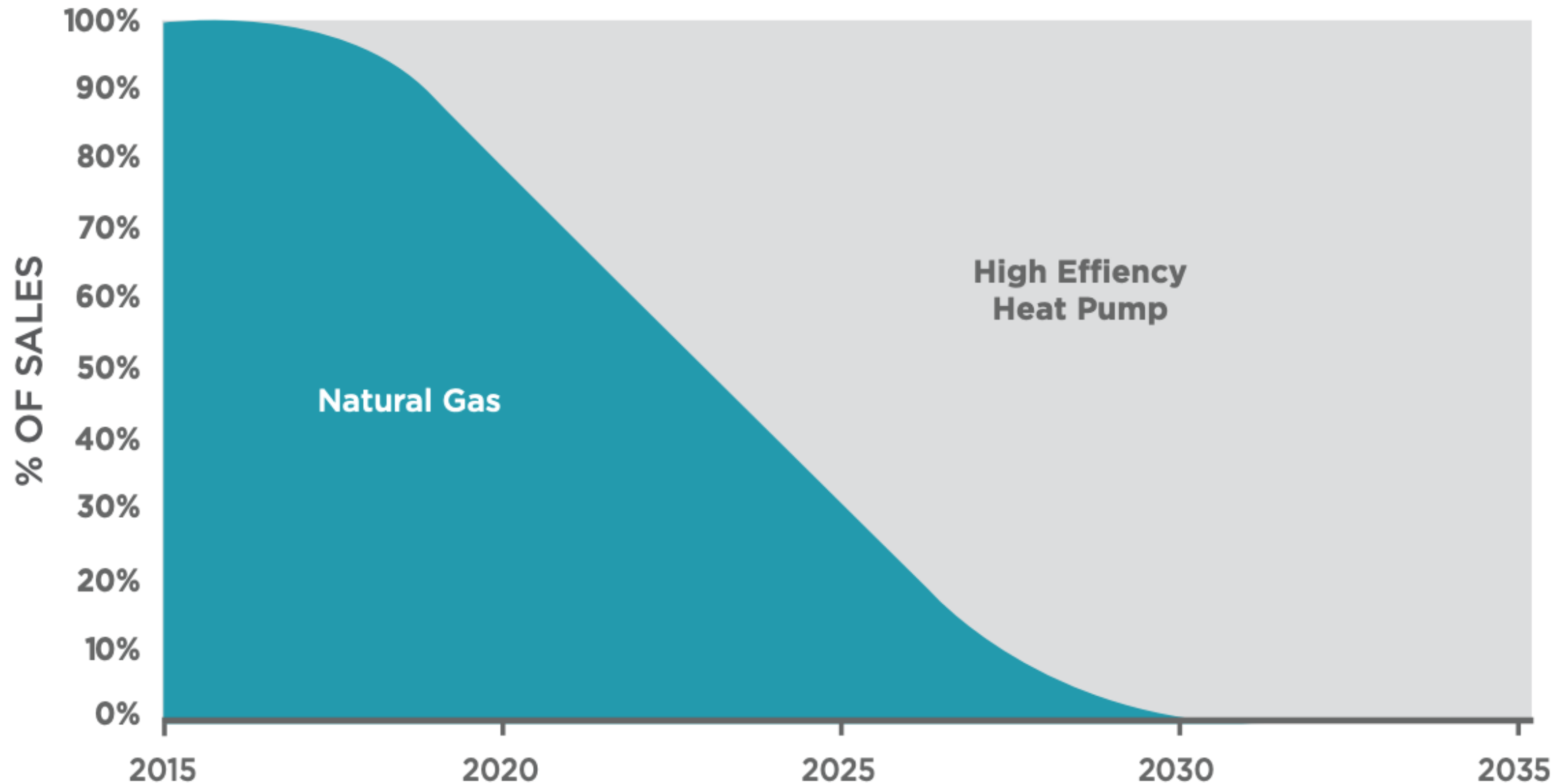


Stock Turnover



Water Heating

Increase the share of high efficiency heat pumps for water heating from 1% of sales in 2018, to 50% in 2025 and 100 % in 2030.



January 16th, 2020 CPUC Business Meeting

“This is a very efficient emerging technology that can greatly assist in reducing GHG and electrification. It can also help in managing peak load. Water can be heated at the right times and then used later on. We are going to need **hundreds of millions, if not billions** to deal with this issue, it’s important to start transforming the market as soon as possible.”



Barriers

Average Installed Cost of Gas WH and HPWH

Gas Home



**Gas Storage
(existing buildings)**

**\$
\$1,000-\$1,600**

0.63 UEF



**Gas Tankless
(new construction)**

**\$\$-\$\$\$
\$3,700-\$5,700**

0.81 UEF

Electric Home



Heat Pump

**\$\$-\$\$\$
\$2,100 to \$7,900**

3.0 UEF

Emergency



Contractor Value Proposition

- Cost at distributor or retail
- Ease of program use



BUILD

“So why would [a plumber] want to learn something like that when he can put in his normal water heater he's always put in, and get several done in a day if he wanted to?”



Final Report
April 22, 2020



EMI CONSULTING

Panel Upgrades and Wiring

Panels: \$3,000-\$4,000

220V Wiring: \$300-\$1,000



Customer Awareness and Value Proposition

Fuel-switching is a leap of faith.

- Need broad-based and specific education
- Need the finances to be clearly better than a gas model, a no-brainer



GOAL 1: Customers, contractors and policymakers are aware of and demand building decarbonization measures.

GOAL 2: Customers receive a good value from adopting building decarbonization measures.

GOAL 3: Building decarbonization provides a better value to contractors than fossil-fuels.

GOAL 4: Supply-chains and delivery agents are able to meet rising demand for carbon-free building technologies with a quality product.

GOAL 5: Policies are aligned to maximize customer awareness of and interest in building decarbonization, the customer, builder and contractor value proposition, and the industry's ability to meet rising demand.



RECOMMENDATIONS

Support rebates and incentives for fuel switching and for upgrading to efficient electric equipment.

Bringing down upfront costs motivates end-users to pursue those options and will help contractors sell this equipment more frequently.



SGIP

_____ \$

January 16th, 2020 CPUC Business Meeting

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Needed

- Long-term (10 Year) State vision for water heating transition and investment plan
- Programs that can lower HPWH unit and installed cost below that of gas alternatives
 - Instant rebates give customers the carrot they need to switch fuels
- Programs that are easy for installers and customers to use
 - Pre-approved product list
 - Mid-stream, instant rebates
 - Simple and fast application and eligibility verification
- Panel upgrade and wiring assistance



Thank you!

Buildingdecarb.org

Heat Pump Water Heaters: Rebate Program, PowerMinder, and load flexibility

Brett Korven
Mike Corbett

5/7/2020

Powering forward. Together.



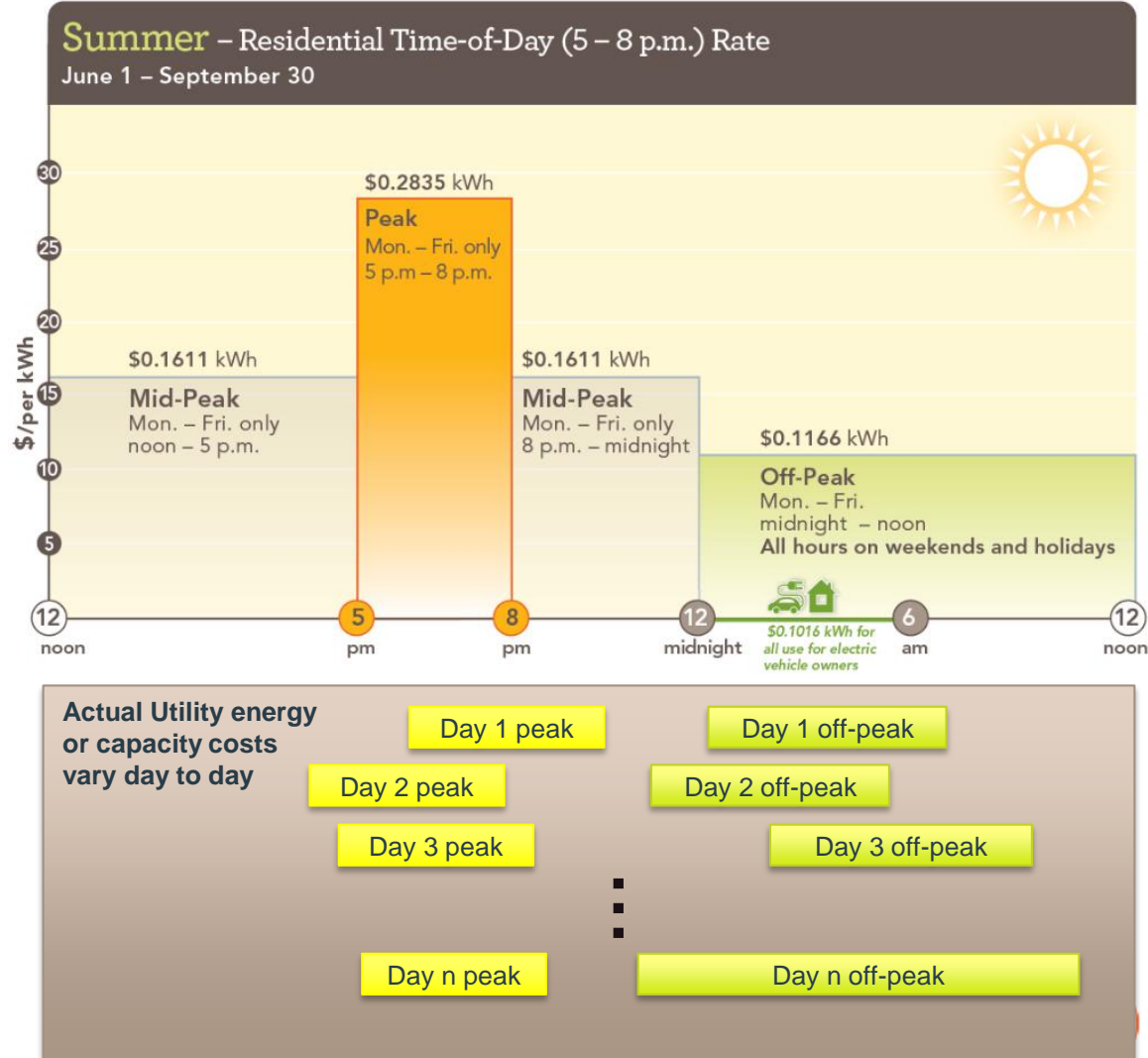
About Sacramento Municipal Utility District

- Not-for-Profit Municipal Electric Utility
- Sacramento County in California with about 625,000 accounts
- Vertically integrated with generation, T&D, and customer facing functions
- Net zero carbon goal by 2040 impacting the generation portfolio, appliance electrification, and load flexibility initiatives



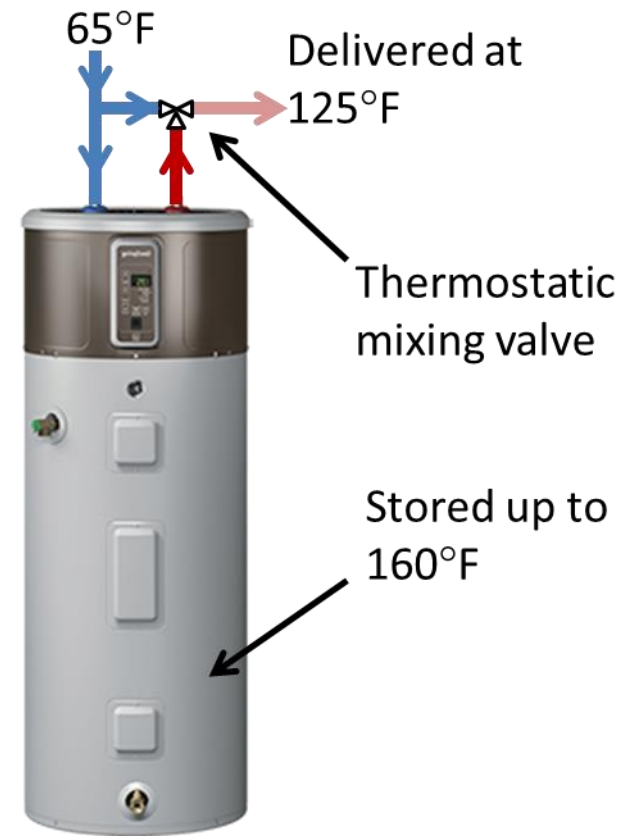
Present day opportunities for Time-of-Day Rates

- SMUD Residential Time-of-Day Rates helps align customer costs with utility costs on average
- Provides an opportunity for shared savings
- However, cost of energy and capacity (bulk and local) are more complex than Time-of-Day captures

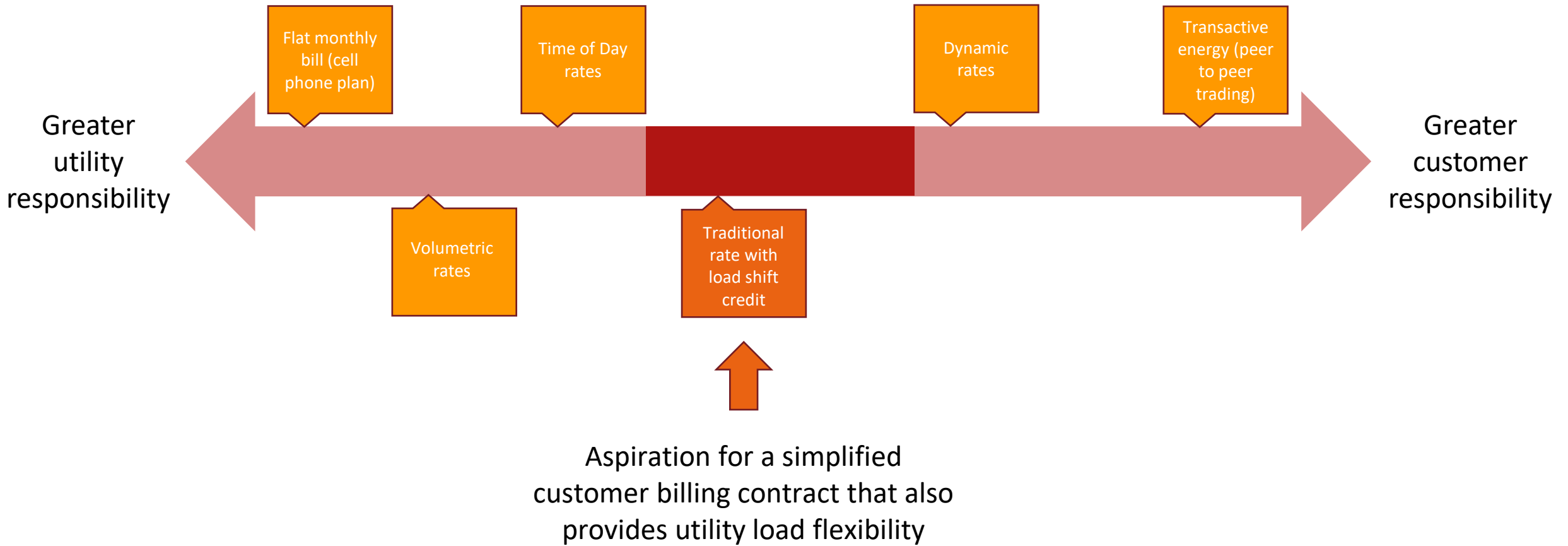


Load flexibility with Heat Pump Water Heaters

- Changing the water temperature setpoint to overheat the water allows for load shifting
- Mixing valve keeps temperature constant for consumed water
- **Shift load without the customer noticing!**



Looking beyond Time-of-Day Rates



Pilot Design

- Research compares 3 modes of HPWH operation
 1. Baseline – no active load shaping
 2. Time of Day (TOD) rate optimization – load shape to reduce on-peak consumption and increase off-peak consumption
 3. Utility influenced load shaping based on utility day ahead electricity costs
- Customer contract design
 - Default mode is TOD rate optimization
 - 120 days/year can be event days – either Baseline or Utility load shaping
 - Customer receives \$75/\$150 up front credit for signing up for the program and \$2/month participation bill credit

Virtual Peaker

Founded: 2014

Located: Louisville, KY

Business Model: SaaS

Other Programs:

- ✓ Glasgow/TVA SET Program (Battery, HPWH, Thermostat)
- ✓ GMP BYOD Program (Battery)
- ✓ Belmont Light Peak Reduction Rewards (All Devices)
- ✓ GMP EV Unlimited Program (EVSE)



POWERMINDER DEVICE OPTIMIZER

- Water Heater Optimization Program
- BYOD Enrollment
- Multi Manufacturer Support



with



How PowerMinder Works

1 PowerMinder heats your hot water when it's most cost-effective.

4 Enjoy watching your energy savings month after month.

2 Hot water is always available when you need it.

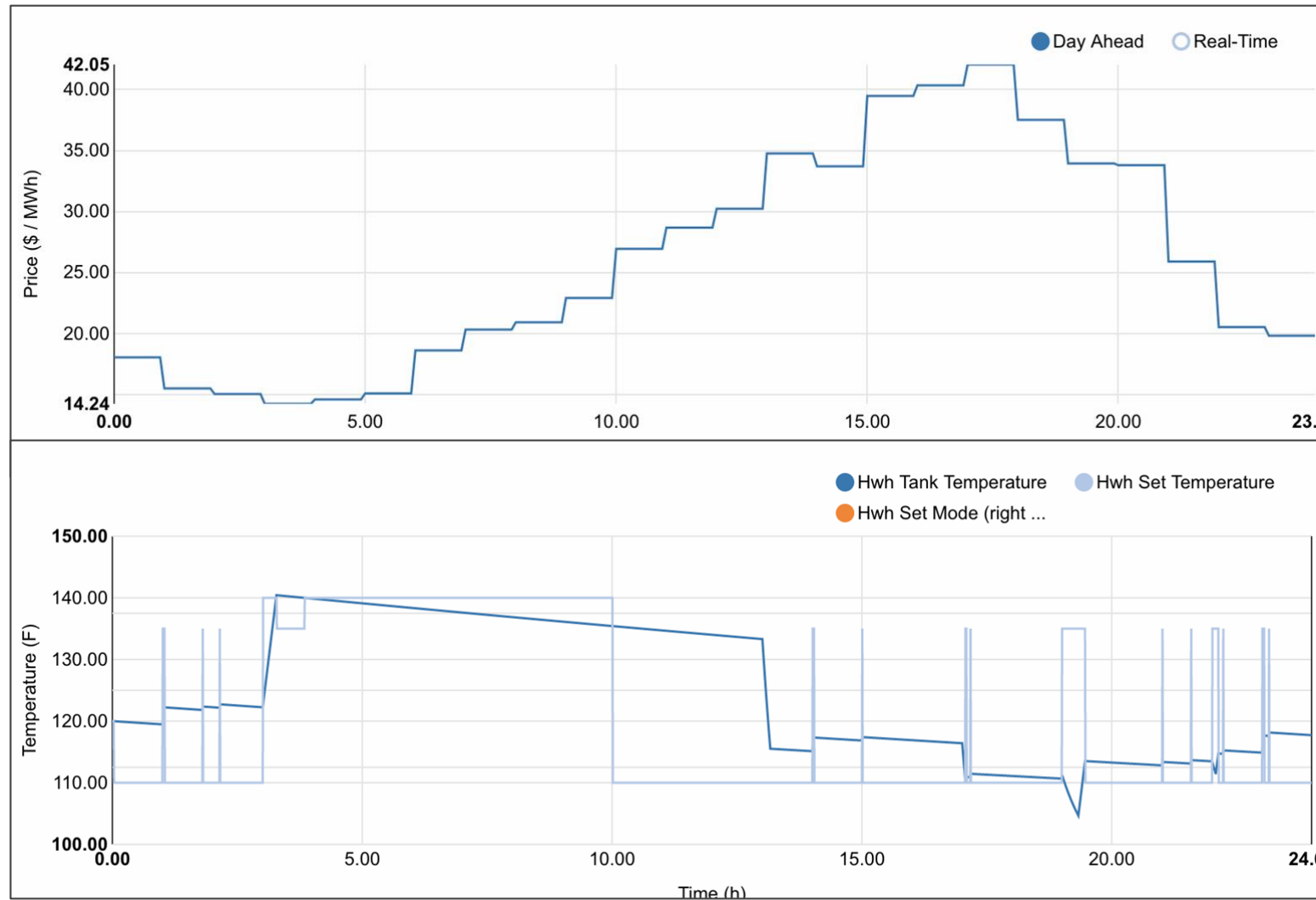
3 You always have ultimate control over your device settings.



Wholesale Cost Optimization

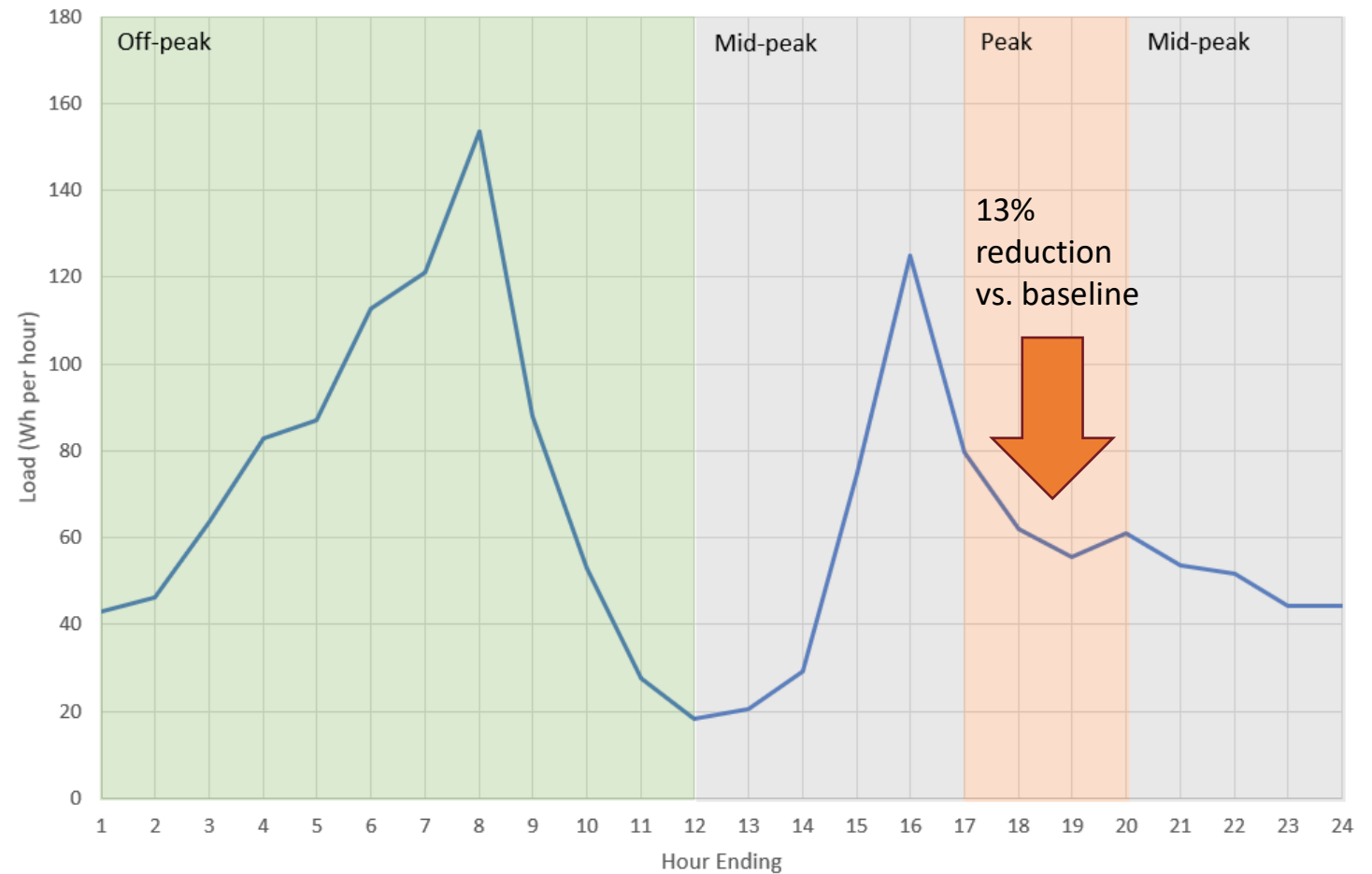
Water Heater Arbitrage

- Learn Water Use Behavior
- Integrate with Pricing Server
- Dispatch Based on Hot Water Capacity and Price
- Optimize Wholesale Cost
- **Ensure Water Delivery Temperature**



Mid Project observations

- 65 customers enrolled so far
- TOD optimization/ ISO Price Responsive/ Baseline groups rotate on event days
- Very little customer feedback after initial setup
- Currently working on OpenADR and CTA-2045 integration



Program Challenges

- Mixing Valve Support
 - Safety Concerns
- Terms and Conditions
 - Mixing Valve Safety
- Multi-Manufacturer Support
 - Different min and max temperatures
 - Different data granularity
- Population Size
 - Learning benefits from large population



Customer Learnings

- Simple Enrollment a must
 - Single POC for credentials
- Few People Change Behavior
- Difficult to manage very low use customers

The screenshot shows a web browser window with the URL `smud.virtualpeaker.io/byod/#/signup/powerminder`. The page header includes the logo "POWERMINDER DEVICE OPTIMIZER" and links for "Help" and "Requirements". The main content area is titled "Step 1" and "Let's sign you up". It contains a paragraph explaining the benefits of signing up for the PowerMinder program. Below this, there are three numbered steps for the signup process: 1. "What is your first name? *" with a text input field and a "Next" button; 2. "Nice to meet you . What is your last name? *" (disabled); 3. "What is your email address? *" (disabled). The footer text reads "Powered by Virtual Peaker | In partnership with SMUD".

POWERMINDER
DEVICE OPTIMIZER

Help Requirements

Step 1

Let's sign you up

Signing up for the PowerMinder program will help you save energy and money without disrupting your lifestyle. Once your eligibility is confirmed, you can take full advantage of program benefits.

1. What is your first name? *

[Next](#) or press ENTER/RETURN
2. Nice to meet you . What is your last name? *
3. What is your email address? *

Powered by Virtual Peaker | In partnership with SMUD

Heat Pump Water Heater Rebate Program

Electric to Electric HPWH

- Rebate: \$500
- Suspended beginning May 29th due to COVID-19 budget impacts
- 2020 Installations YTD: 58
- 2019 Installations: 125
- 2018 Installations: 125

Gas to Electric HPWH

- Rebate \$2,500
- Suspended beginning May 29th due to COVID-19 budget impacts
- 2020 Installations YTD: 597
- 2019 Installations: 1,118
- 2018 Installations: 171

Key Program Drivers

Supply Chain Partnership

- Built relationships with local distribution network in Sacramento region (Ferguson, PACE, Slakey Brothers, Home Depo Specialty Trade Pros, others)
- Actively engage key contractors (bulk of installations done by 4 contractors)
- Created feedback loop with manufactures so they can better assist in training and contractor support

Payment and processing

- Rebate levels to achieve cost parody with installing a natural gas tank water heater (customer out-of-pocket \$1,800 or less)
- 7-10 day payment turnaround
- Assignment of the rebate payable to the contractor
- Simple requirements
 - QPL, 1-page rebate form, pre-post photos, invoice

Program Challenges

- Mixing valve requirement- YES or NO?
 - From a liability standpoint, if a utility is going to control water heater temperature, IT IS A MUST
 - From a practical standpoint, the mixing valve may create more customer satisfaction problems than it solves
 - Water not hot enough for customer's liking
 - Wrong temperature range valve installed (90-110 versus 90-140)
 - Construction challenges (slab on grade buried plumbing)
 - Mixing valves are installed 80%+ of the time wide open to avoid customer call back to adjust
- Sizing 50,65 or 80?
 - Still see almost 100% of installs with 50 gallon, where larger units should have been used
 - No demand for larger units, means limited supply
- Running electrical circuits is expensive
 - \$500+
 - This will not be solved by a 120V unit. Either way 240V or 120V, will require dedicated power

Future of SMUD HPWH Program

- Beginning May 29th, 2020 the program is suspended
- Changes to promote future installations
 - SMUD is still providing incentive to change electrical panels and add a future HPWH circuit during a customers HVAC conversion from gas to electric
 - For these customers, it would allow for a faster, less expensive change-out
 - Possible distributor or manufacture buydown?
 - Still must achieve cost parity with gas tank water heater in order to be a viable option for customers to adopt

Questions

Rebate Program Questions

Contact:

Mike Corbett. Phone: 916-732-6798, Email: Michael.Corbett@smud.org

Load Shifting, controls etc.

Contact:

Brett Korven. Phone: 916-732-6115, Email: brett.Korven@smud.org

Multifamily Heat Pump Water Heating Systems & Technologies



Nick Dirr
Director of Programs
Association for Energy Affordability

May 7, 2020

Opportunities for HPWH in Multifamily

- **Individual apartment water heaters**
 - ~11% of apts are unitary electric
 - ~39% of apts are unitary gas
- **Central water heaters serving multiple apts**
 - ~50% of apts are central gas
- **Other**
 - Water heaters serving only shared laundry rooms
 - Pool/spa water heaters



Heat Pump Water Heaters - Individual



Split Heat Pump
Water Heater



Combined Heat Pump
Water Heater

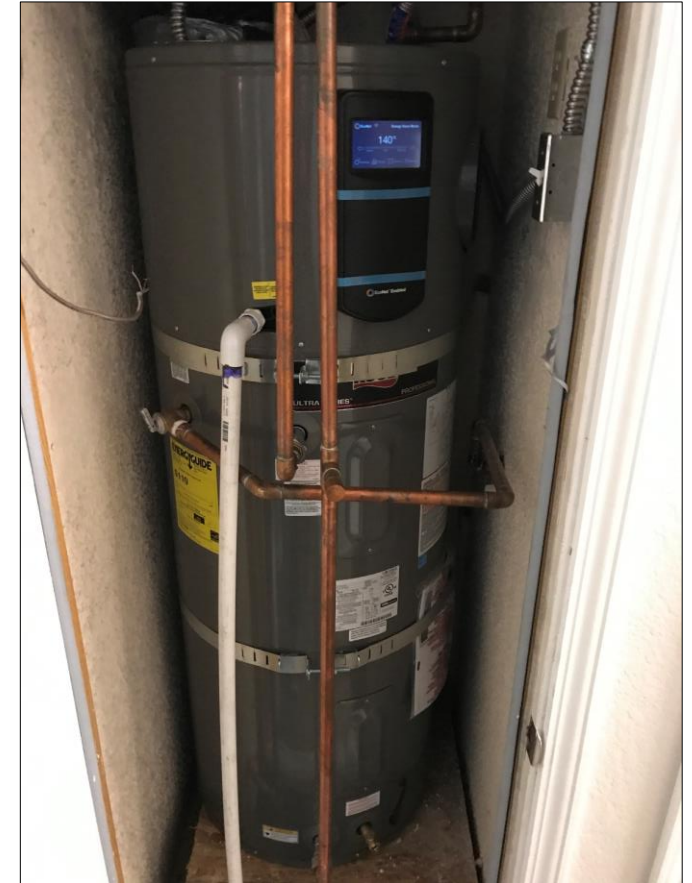


Heat Pump Water Heaters - Central



Residential Apartment Water Heaters

- Same technologies as residential/single family applications
- Multifamily nuances
 - Typically located in internal or external closets
 - Ducting or volume space challenges
 - Limited electrical panel capacity and breaker spaces
 - More complexity for dedicated circuit runs
 - Tenant turnover and associated changes in Wi-Fi
 - Many apts have fewer water fixtures but higher occupancy density relative to single family



Central Multifamily Considerations

- **Electrical**

- Large amperage units (100A/240V) or 3-phase equipment
- Distance from nearest panel (scattered sites)
- Transformers

- **Space**

- High volume storage tank(s)
- Heat pump location(s)

- **Recirculation**

- Higher return temperatures and flow rates
- Constant loads



Central Heat Pump Water Heater Types

Units Served	HPHW Types	Example Products
2-8 apts	65-80 gal individual HPWH	Large Residential HPWH: Rheem, AO Smith, Sanden, others
10-25 apts	Central tank-type, split HPWH	AO Smith (CAHP-120), Sanden (“ganged”)
25+ apts	Central HPWH w/ large tank(s)	Colmac, Nyle, Mitsubishi (2021), Rheem (Australia)









Image: AEA



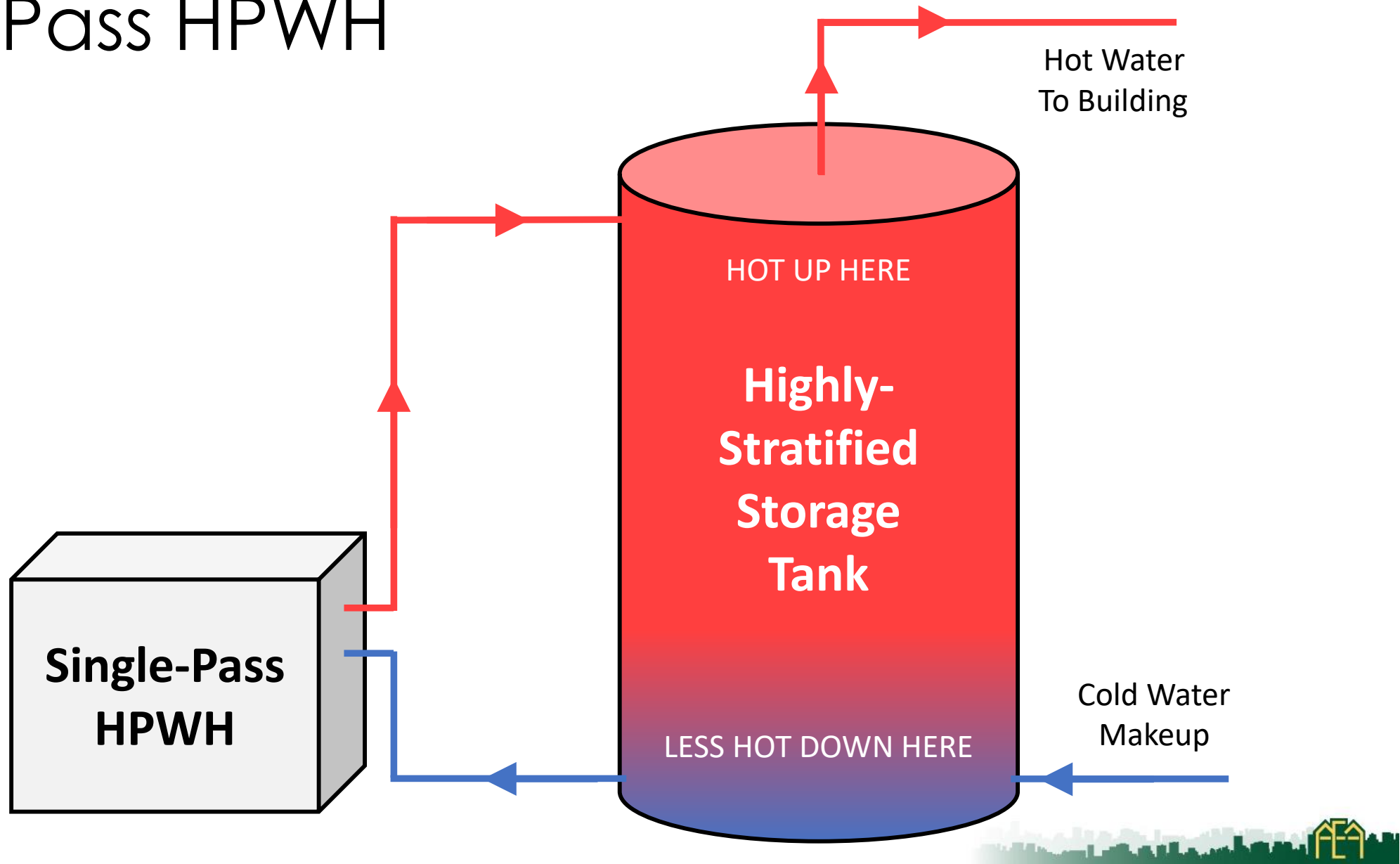




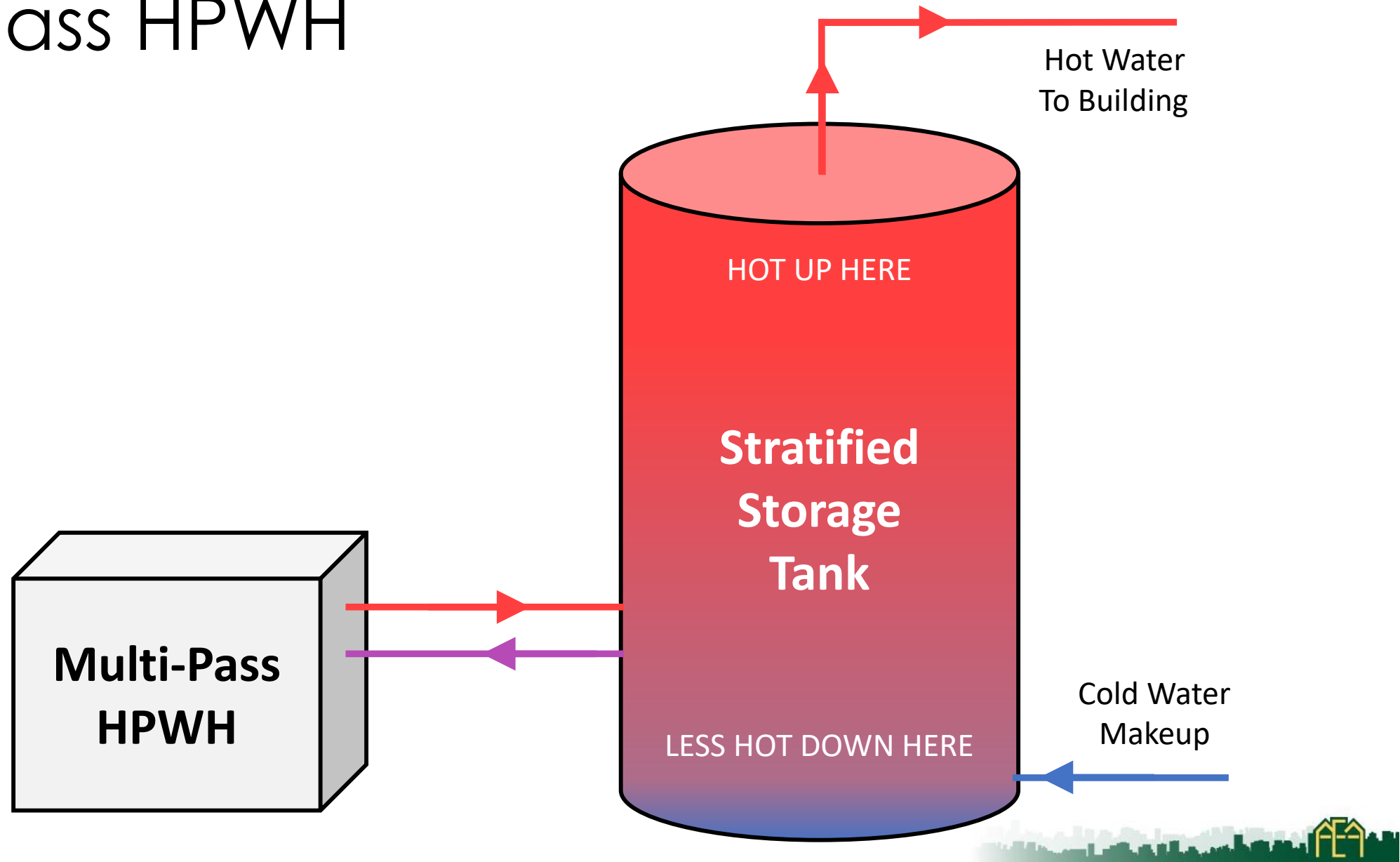
Central HPWH System Configurations



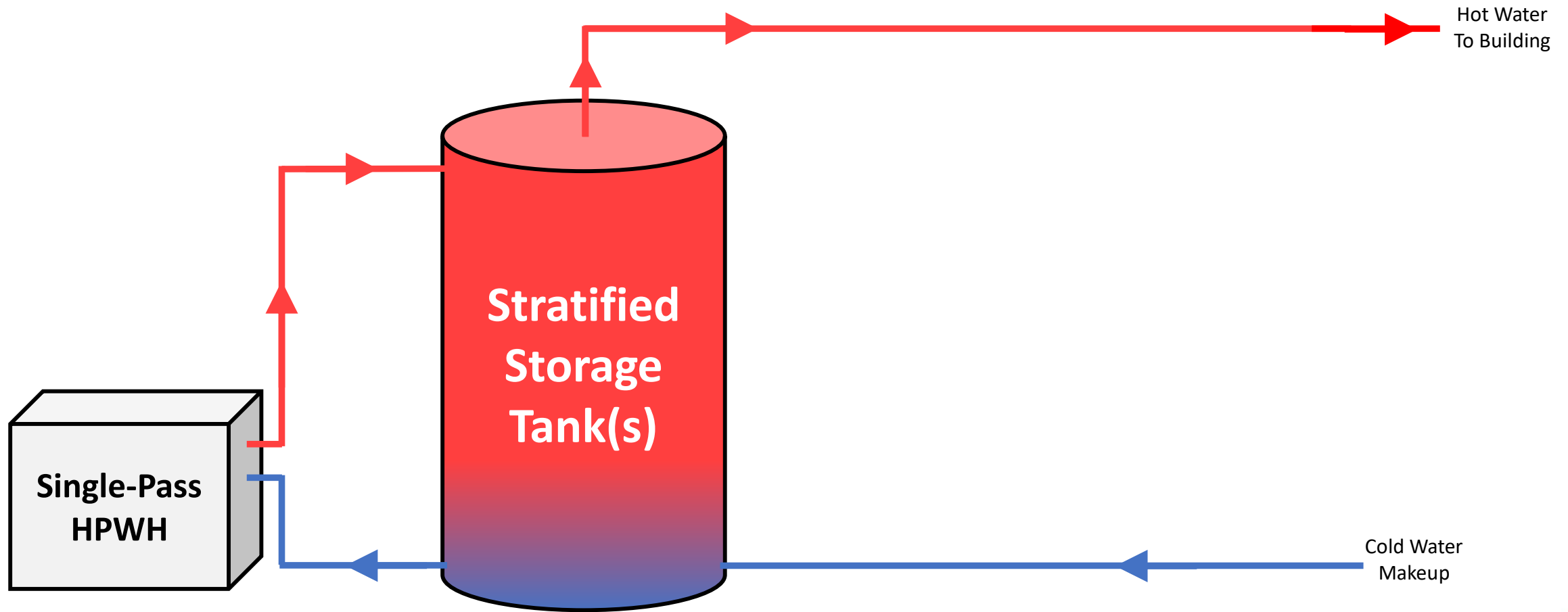
Single-Pass HPWH



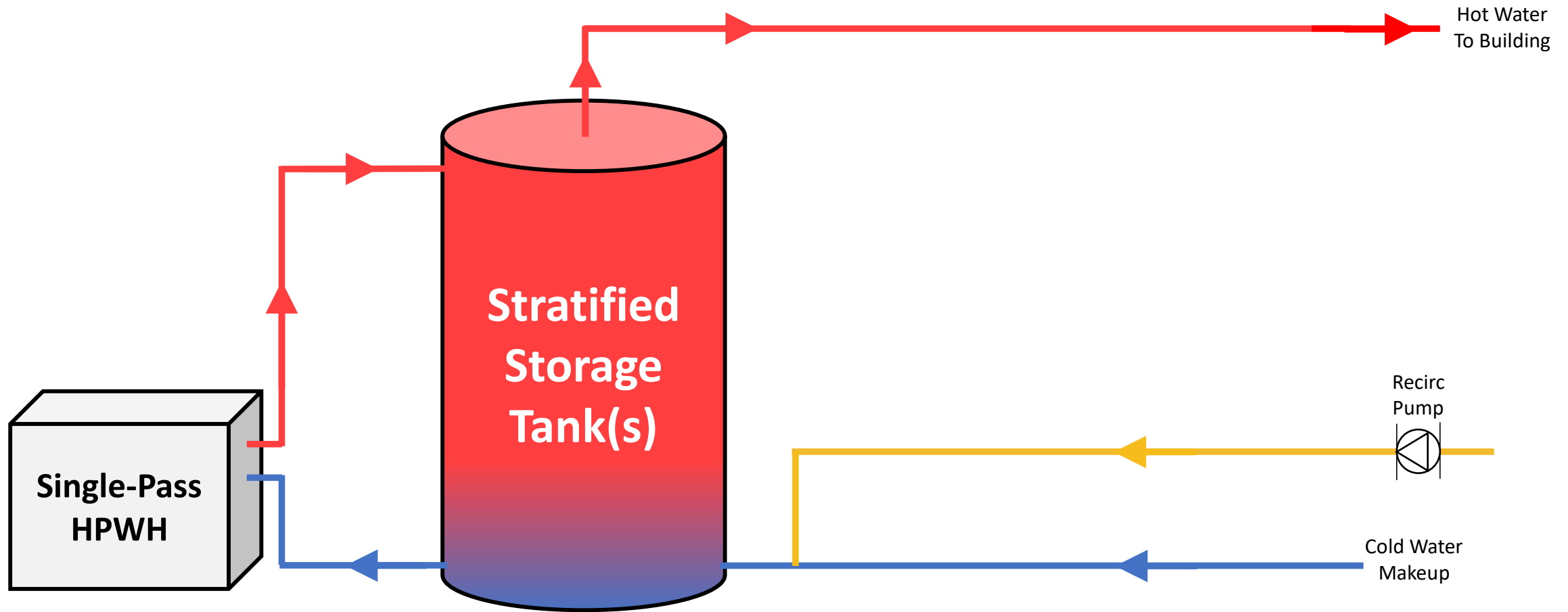
Multi-Pass HPWH



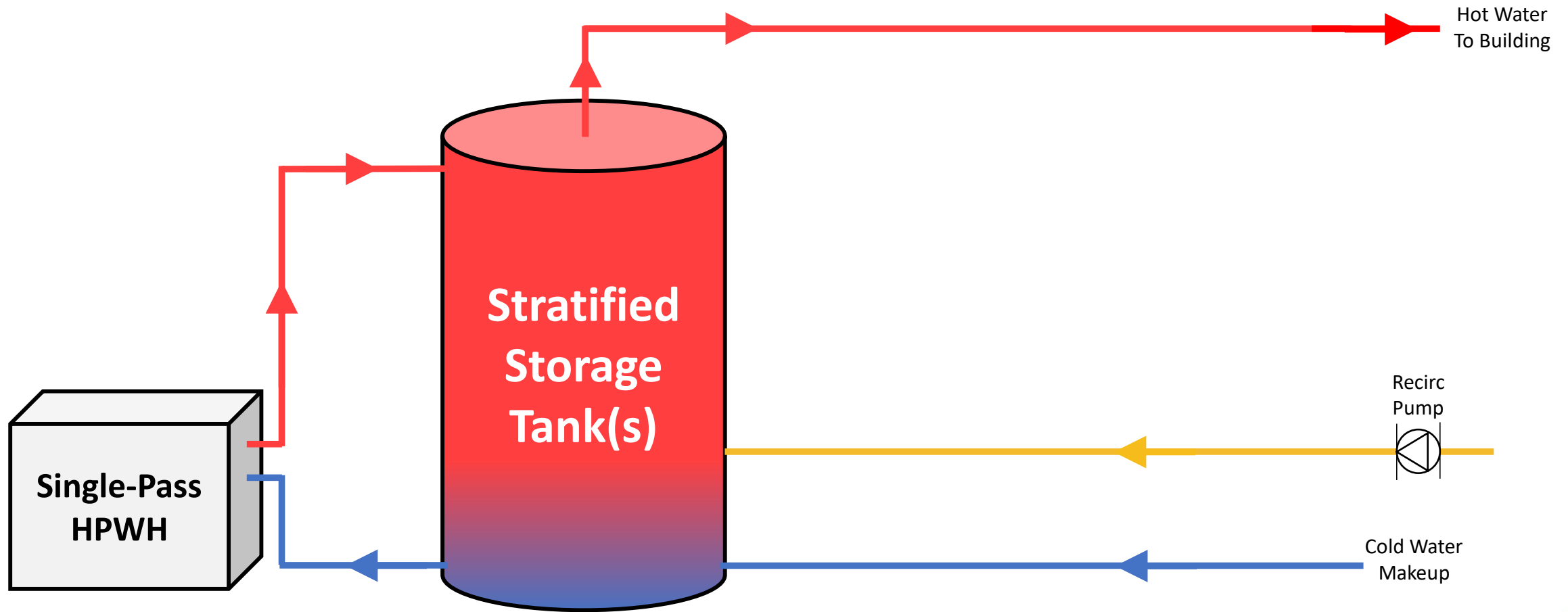
What about Recirculation Return?



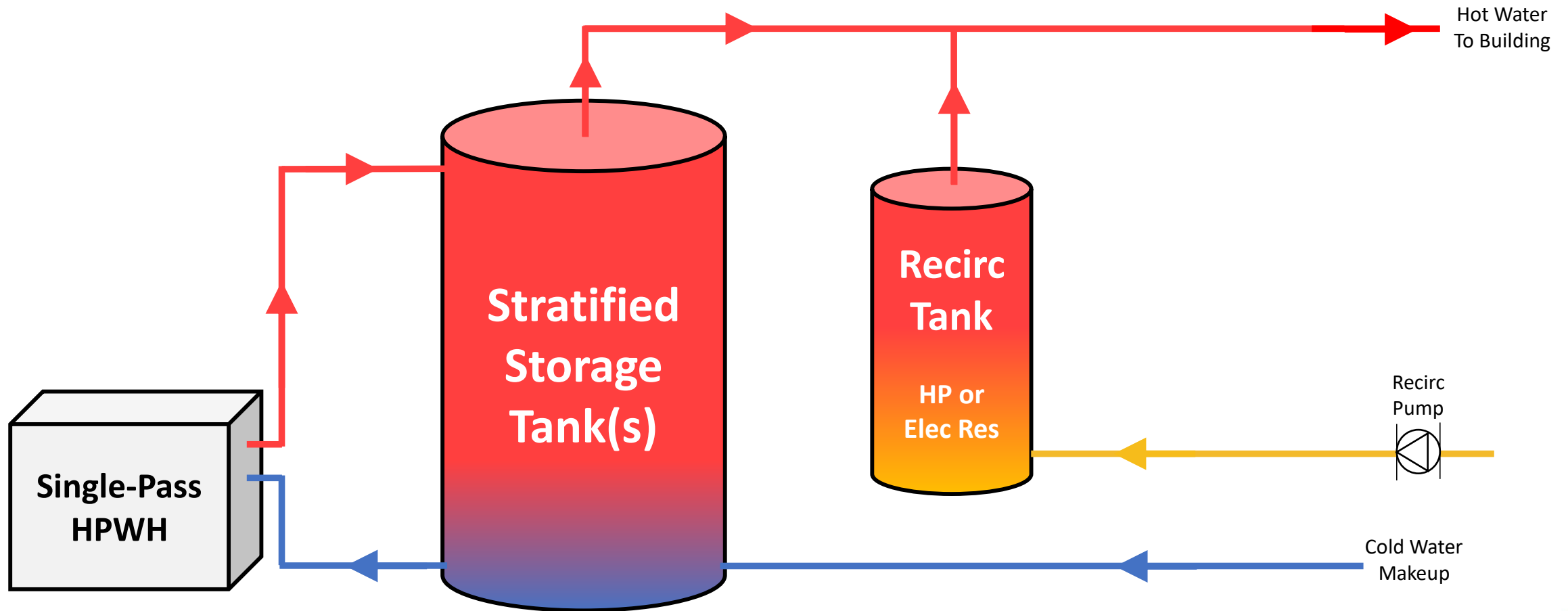
What about Recirculation Return?



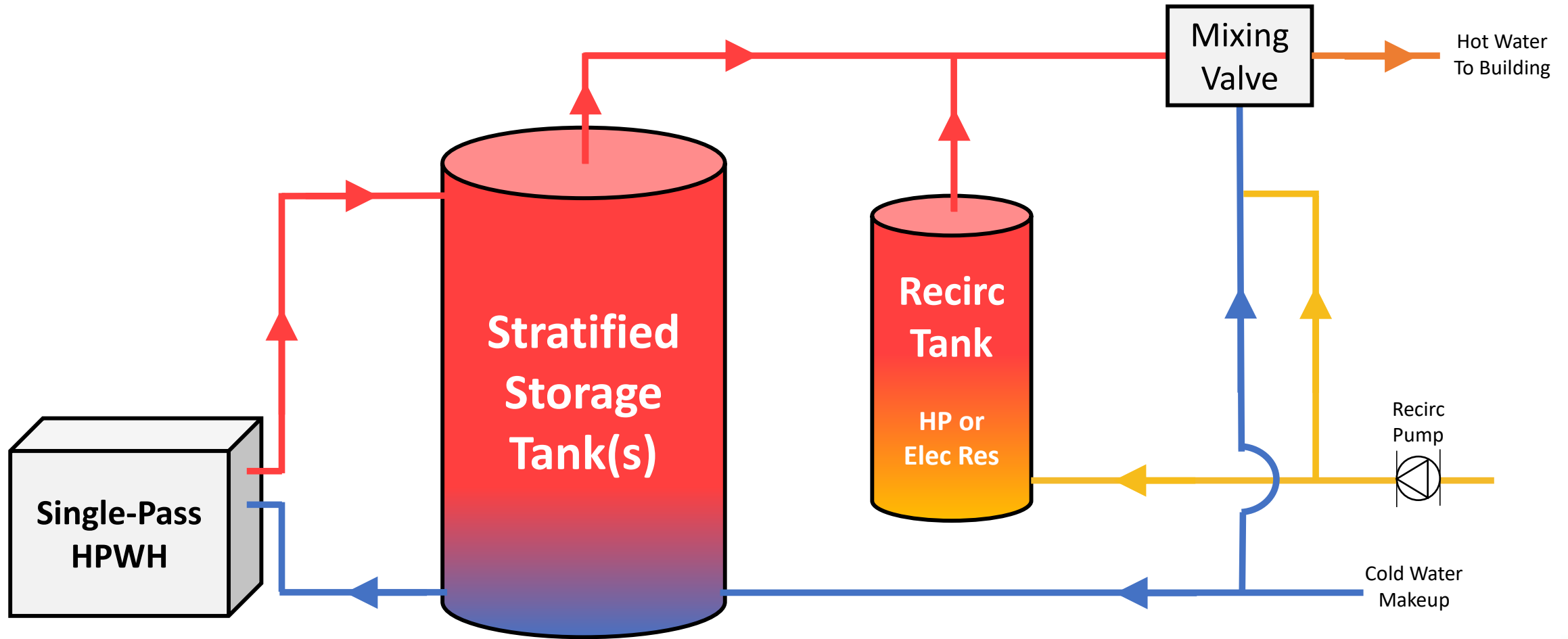
What about Recirculation Return?



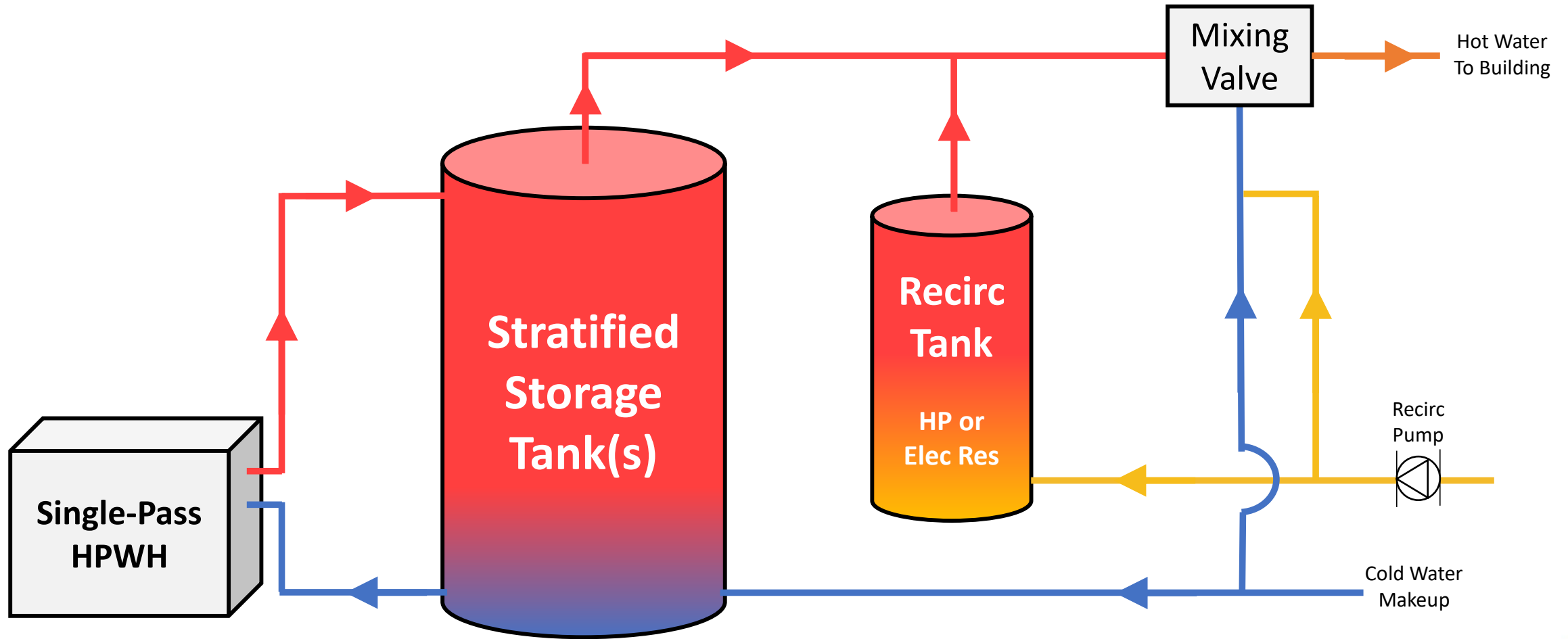
What about Recirculation Return?



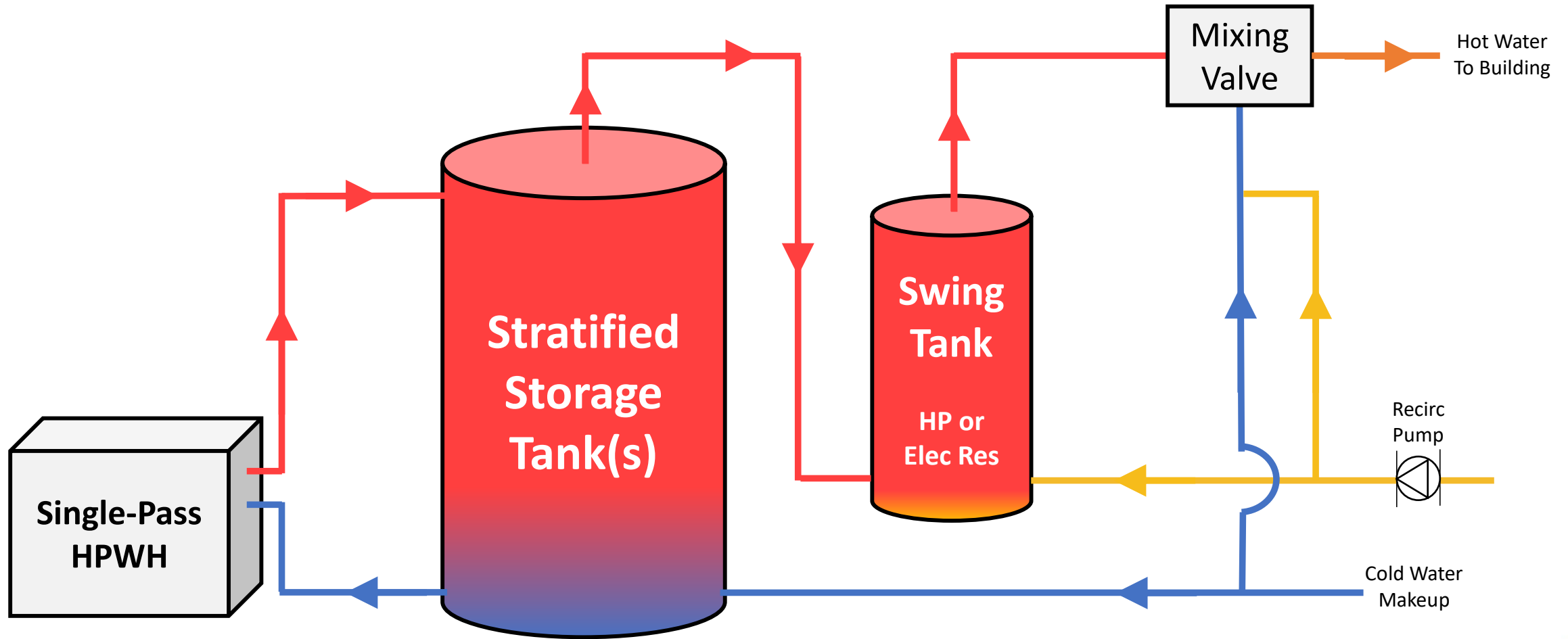
What about Recirculation Return?



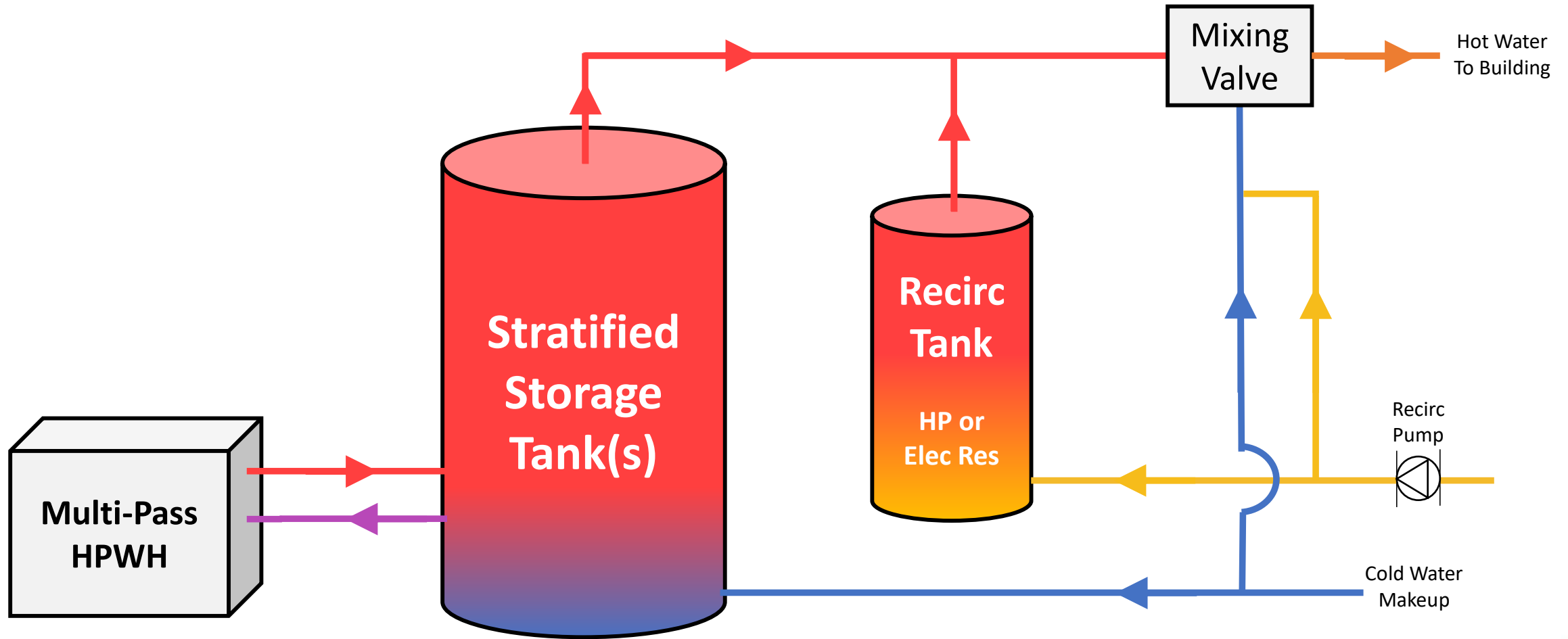
Single-Pass w/ Recirc Tank



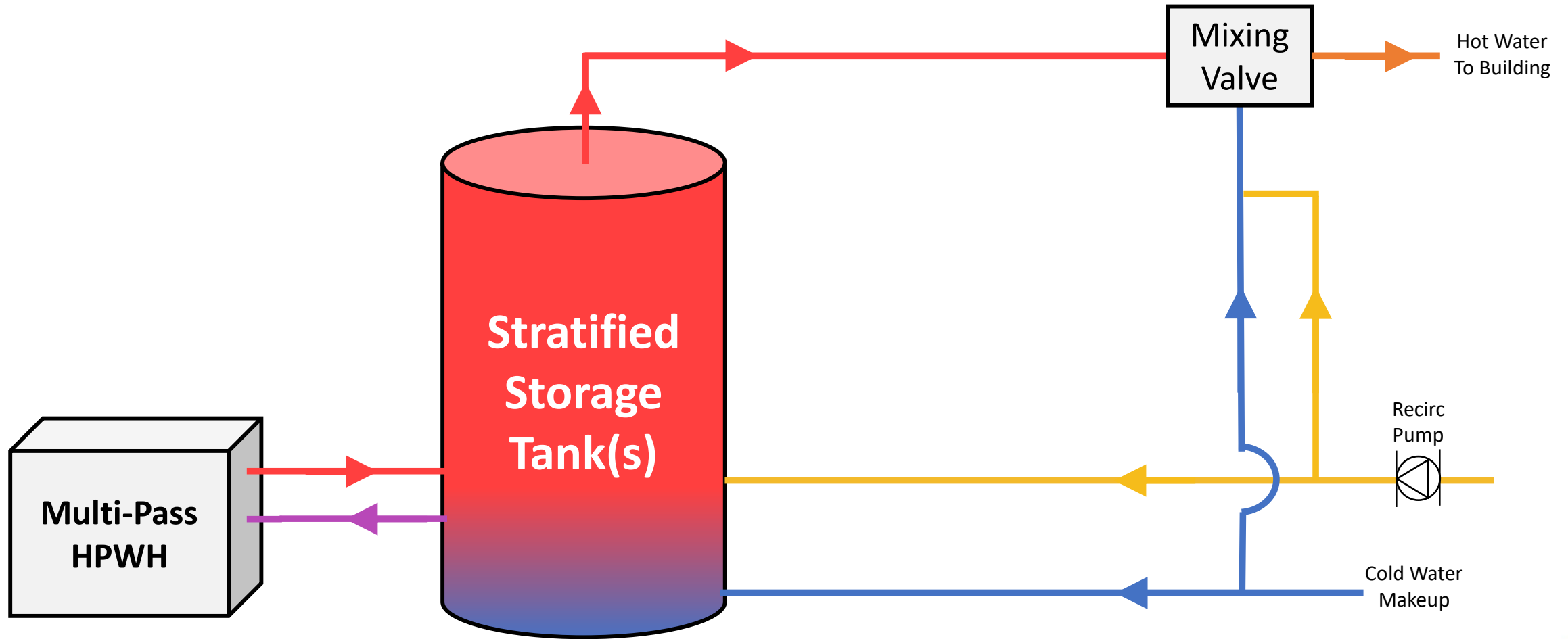
Recirc – Single Pass w/ Swing Tank



Multi-Pass w/ Recirc Tank



Recirc – Multi-Pass Direct Return



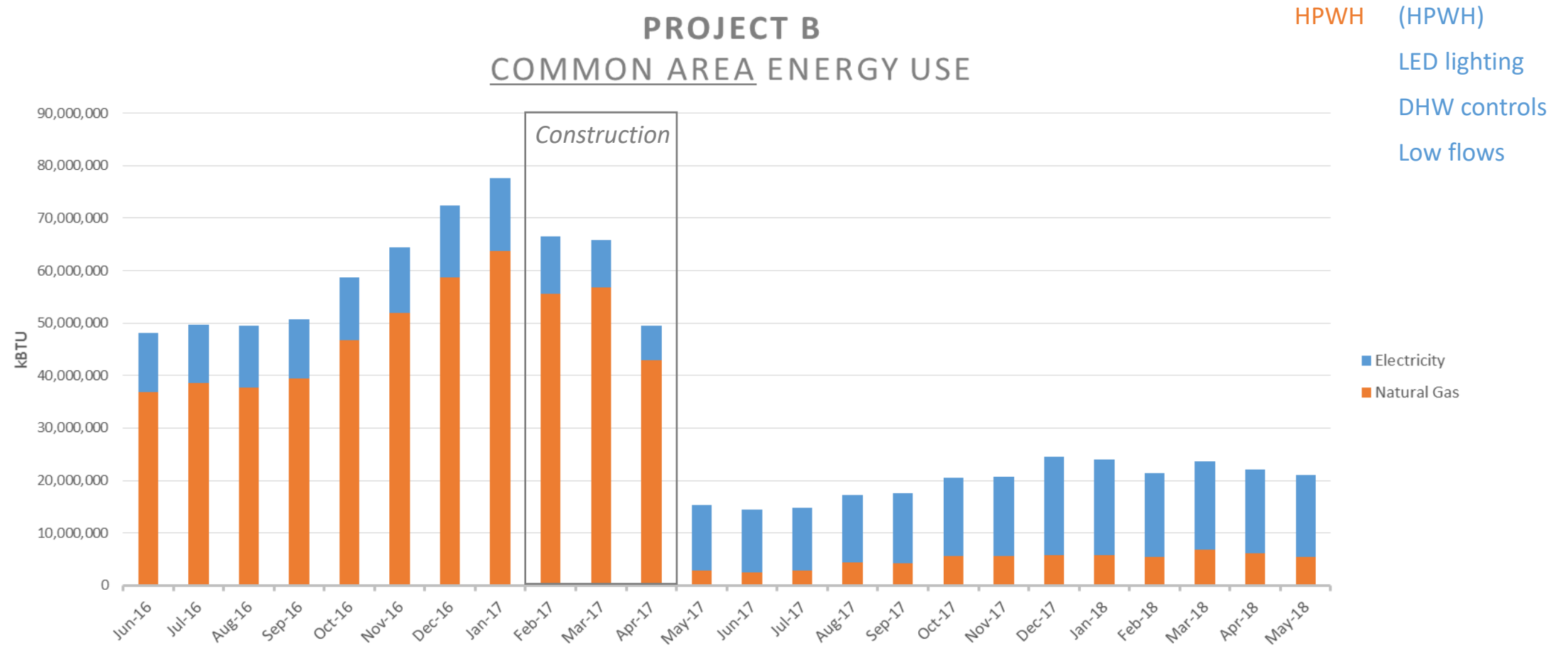
Sizing and Load Shifting

- **Ample hot water storage** is critical
 - Allows for less heat pump
 - Increases potential for meaningful load shift
- Limited remote control options
 - Some are not yet control-compatible
 - Some have proprietary control hardware and software
 - One can use third party control
- Research and demonstration projects ongoing – standardization needed



Flow Monitoring for Sizing New HPWH System

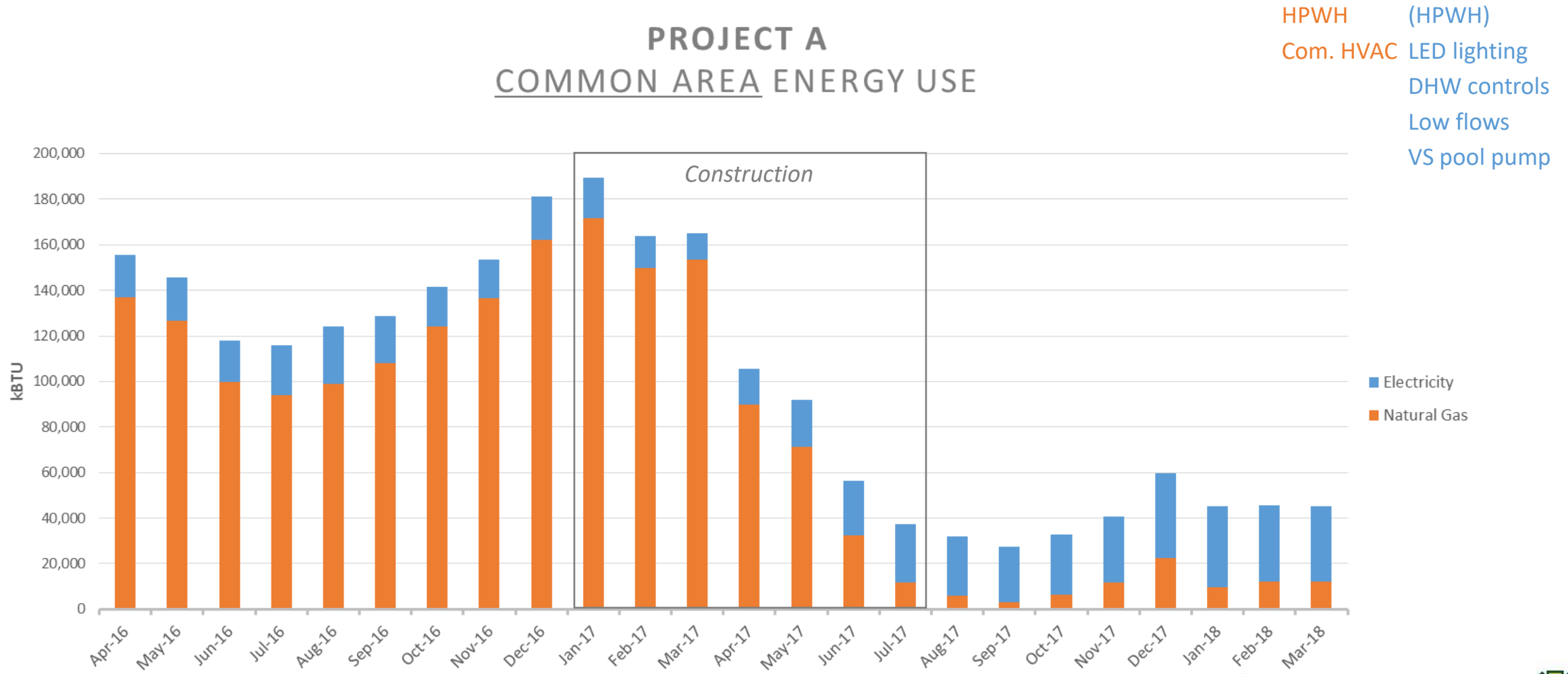
Central HPWH – Energy Savings





Central HPWH – Energy Savings

PROJECT A COMMON AREA ENERGY USE



Thank you

Nick Dirr | CPHC, CEM

Director of Programs

ndirr@aea.us.org

510-431-1792





Equity Considerations for Heat Pump Water Heaters

May 7, 2020

People. Planet.
Employment.



AGENDA

- Intro
- Clean Energy Barriers in Frontline Communities
- Addressing Barriers in Program Design
- Equity recommendations for HPWH in SGIP

Introduction



Our Vision & Mission

Founded 2001 – nation's largest nonprofit solar installer

GRID makes renewable energy technology and workforce training accessible to underserved communities

GRID advocates for equitable & inclusive solar and renewable energy policies and programs



Key Programs & Initiatives

GRID is Program Administrator (PA) of multiple low-income solar programs

- SASH
- DAC-SASH
- LIWP single-family solar
- SOMAH (co-PA)



GRID's Impact

Systems Installed: 11,400+



kW Installed

48,000+



Lifetime Savings

\$343 Million+



Participants Trained

29,500
(1,500+
placements)



Tons of Greenhouse Gas
Emissions Prevented

850,000+

Benefits of Clean Energy Access in Frontline Communities

- Cost savings / stabilization / reduced energy burden
- Tools to mitigate and adapt to climate change and COVID-19
- Access to comprehensive services such as energy efficiency, supplement energy assistance programs
- Reduced shutoffs
- Accessible job training and economic opportunities
- Health and safety
- Resiliency
- Environmental justice

Clean Energy Barriers in Frontline Communities

Barriers to Clean Energy in Frontline Communities

- Sensitivity to up-front costs
- Difficulty obtaining loans, power purchase agreements, or other financing
- Inability to take advantage of tax incentives
- Renting rather than owning; mis-aligned incentives to invest in energy savings
- Site barriers: inadequate space, unpermitted work, faulty wiring, MSP upgrades needed, etc.
- Distrust of salespeople due to history of predatory practices in LMI communities
- Language and/or energy literacy barriers
- More info in SB 350 Barriers Report

Addressing Barriers to HPWH within the SGIP Equity Budget

The HPWH \$4M set-aside is a carveout within the SGIP Equity Budget¹ therefore, Equity Budget principles should apply to HPWH program design:

Affordability

- Customer should not have to pay out of pocket to access HPWH benefits
- Incentive levels should cover all costs, including equipment, installation and ongoing management and operations
- Consider incentive payments to equity project developers prior to installation to ensure viability during COVID-19

Dedicated ME&O

- Dedicated ME&O Budget should communicate with customers in their languages, at their energy literacy levels, through existing channels used by customers (e.g. internet may not be an option)

Streamlining/Leveraging

- Co-marketed alongside complementary programs: SASH/DAC-SASH, SOMAH, ESA, SJV pilots, CARE/FERA, etc.
- Maintain same eligibility thresholds as general SGIP Equity Budget
- Consider automatic eligibility pathways with complementary programs

1. Decision 19-09-027, p.72

Additional Considerations not yet in SGIP Equity Programs

Consumer Protection

- Building upon other successful equity programs, measures should ensure customers receive a certain threshold of savings or benefit, and are protected from financing mechanisms likely to be harmful (e.g. liens on homes)
- Mechanisms to inform customers of risks, such as consumer info packets and/or a dedicated Consumer Advocate

ME&O Partnerships

- A portion of the ME&O Budget should be shared with organizations already trusted and known by communities: CCAs, CBOs, SJV CENs, low-income solar PAs, and other low-income clean energy program administrators

Workforce Development

- Strengthening pathways to clean energy careers is a great benefit to communities that can be provided by equity programs!
- Consider: requiring trainees on installations, creating resume- and job-banks, tracking job placement, creating partnerships with Job Training Organizations (JTOs)

Additional Considerations for the HPWH technology

Technology Education

- HPWH are a relatively new technology, and customers may have less familiarity than with solar, battery storage or EE. ME&O may need to cover 'the basics' more than other technologies
- Of note: HPWH provides numerous benefits, but only battery storage provides resilience during outages

Alignment with Electrification

- SGIP-incented HPWH should be enabled to pair with broader decarb/electrification programs, including the SJV pilots, TECH, BUILD, and other programs

Bill Protection

- Low-income households are sensitive to bill increases. If the customer is switching away from propane or gas to electric, and/or changing rates, a comprehensive energy bill analysis, along with usage education, should accompany a HPWH installation



People. Planet. Employment.

Elise Hunter

Policy & Regulatory Affairs Director
ehunter@gridalternatives.org



Self-Generation Incentive Program (SGIP) Heat Pump Water Heater (HPWH) Workshop

Break until 10:45 AM

California Public Utilities Commission (CPUC)



SGIP HPWH Program Design Principles

May 7th, 2020

SGIP Webinar

Developed with input from broad industry and climate advocates coalition



HPWHs are Fundamentally Different than Typical SGIP Systems

- Unitary HPWHs are more analogous to home appliances
- Water heaters are a necessity for every home
- Consumers typically purchase water heaters when their existing one breaks and seek to replace a broken system within hours
- SGIP rebates for unitary HPWHs must be instant and readily available via a simple process. Otherwise, the State misses out on a critical opportunity to upgrade for an additional 12 to 15 years (when the water heater is likely to be replaced again)

Principles

- Ease of Validation
- Simple, Yet Verifiable Application Processes
 - Differentiated by size
- Extra Incentives for Systems that Can Load Shift
- Additional Project Costs Covered
- Project Caps
- No Double Dipping, Possible to Access Additional Costs
- Equity Assistance

Ease of Validation

- SGIP eligibility for HPWH models should be linked to easily validated programs
- Examples: Eligible HPWH models would be only those certified by NEEA for advanced water heating specification Tier 3 version 6 or 7, California Energy Commission for JA13, EPA's ENERGY STAR program, or California Energy Commission's Title 24 CBECC Software or equivalent certification
- The SGIP Program Administrators shall establish a linked list with the CEC, NEEA, and EPA's ENERGY STAR eligible HPWH lists. These lists by EPA, NEEA, and CEC shall be hyperlinked in the SGIP handbook

Simple, Yet Verifiable Application Processes

Similar to today's SGIP, the HPWH program should have different reservation processes depending on the type and size of the project and incentive amount.

Smaller HPWH Systems (small residential and commercial)

- A midstream instant rebate that is available to the distributor, contractor, or retailer within the IOU service territories.
- A new mobile portal in the SGIP database will need to be established and maintained by the SGIP Program Administrators to verify eligibility and capture end-user address data.

Smaller HPWH Systems (small residential and commercial) - Continued

- For example, a customer would go to a big-box retail store that is advertising an instant rebate. The customer could use their smartphone to scan a QR code and enter the data necessary to get the rebate redemption code. The rebate would then be given directly to the customer by the big-box retailer.
- The rebate would be given instantly and cross-referenced with available SGIP funds in a given IOU service territory in real-time. At this point, funds would be “reserved” and the distributor or retailer would receive reimbursement on a monthly basis.
- Additional eligible project costs would be applied for via an additional rebate process once work is complete and proven. The same online system would be used.

Larger HPWH Systems (large residential and commercial)

- A 2-step process wherein (1) the incentive amount is reserved and (2) the project is built and verified funding is received by the developer or system owner.
- Due to longer project lifecycles (18-24 months) than smaller projects, developers need assurance that incentives will be available at time of project completion.
- Similar to SGIP projects today, project cap levels will be established.

Extra Incentives for Systems that Provide Additional Help for the Grid

- HPWHs that can shift load should be provided with an additional incentive because of the additional value they can provide to the grid.
- Systems must meet pre-set eligibility requirements (e.g., JA13 compliance, program standards) and must also be on the SGIP pre-approved HPWH lists discussed above (i.e., CEC, NEEA, and EPA's ENERGY STAR eligible HPWHs.)

Additional Project Costs

- All HPWH projects shall be eligible for additional project costs to include:
 - labor
 - panel upgrades
 - wiring
 - supply and return plumbing
 - electrical components
 - expansion tanks
 - code required upgrades
 - construction costs.
- Smaller systems will submit for additional project costs post installation via the online portal once work is completed. Larger systems will submit via their application process (similar to large storage projects today).

Project Caps

- There should be a per project cap on HPWHs within the SGIP program.
 - Unitary Residential, Unitary Commercial and Central Commercial projects should have per project caps
 - Central Residential should have a per apartment cap as well as an overall project cap

No Double Dipping for Unit Rebates, Possible for Additional Costs

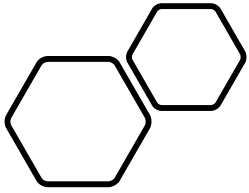
- HPWHs that receive an SGIP incentive shall not be eligible for other active rebates or incentives.
- All IOU customers are eligible for rebates relating to eligible product costs as described above.
- Recipients shall decide which program they want to take advantage of.

Equity

- Projects serving disadvantaged communities should be given special consideration in distribution of funds. This should occur via the creation of a separate, protected category for equity customers.

Principles

- Ease of Validation
- Simple, Yet Verifiable Application Processes
 - Differentiated by size
- Extra Incentives for Systems that Can Load Shift
- Additional Project Costs Covered
- Project Caps
- No Double Dipping on Units, Possible to Access Additional Costs
- Equity Assistance



SGIP HPWH Budget Allocation & Incentive Proposal

Pierre Delforge (NRDC), Kayla Robinson, Panama Bartholomy (Building Decarbonization Coalition),
Matt Vespa (Earthjustice)

May 7, 2020

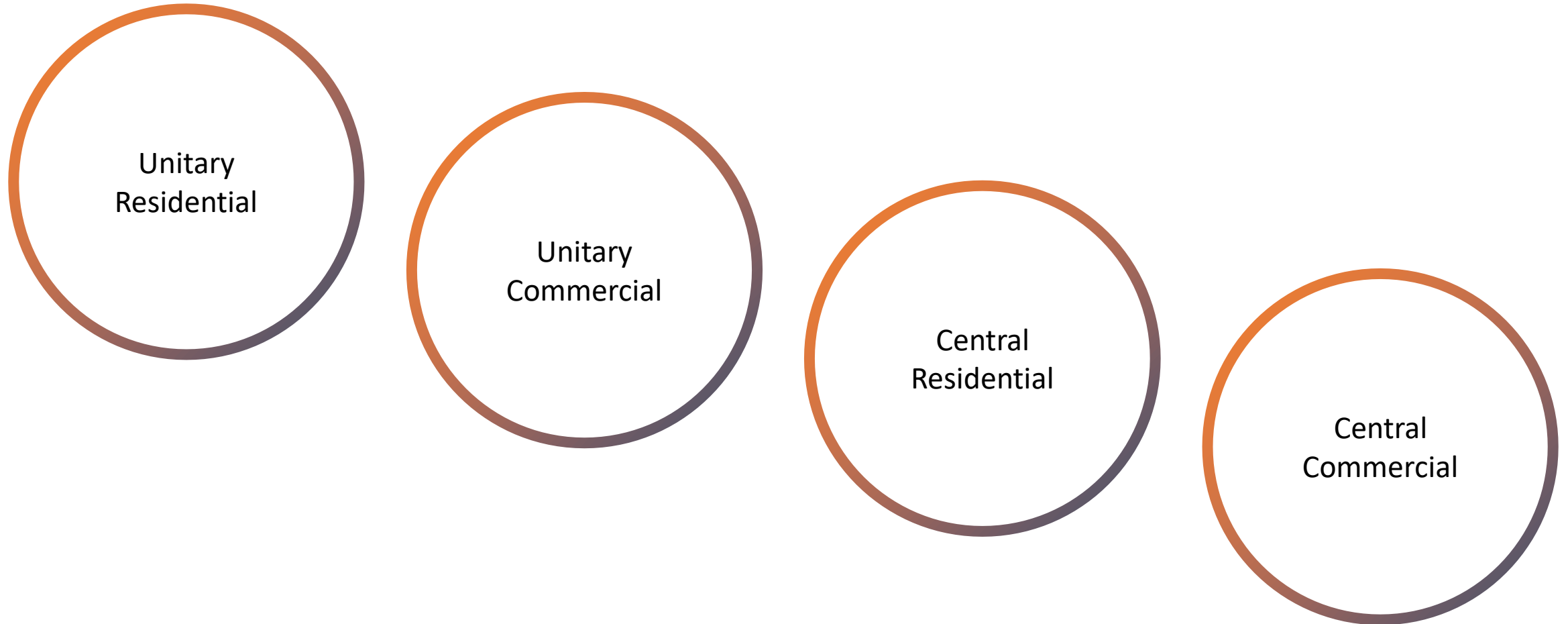
Budget Allocation

Similar to the treatment of energy storage systems today in SGIP, we suggest carve outs by category of HPWH:

Unitary or Central – Equity	At least 30% of Overall Budget (\$13.4 MM)
Unitary Systems – Open*	At most 50% of Overall Budget (\$31.3 MM)
Central Systems – Open*	At most 20% of Overall Budget (\$13.4 MM)

*Open: any customer, equity and others

4 Classifications of HPWH Systems



Classifications of HPWH Systems

HPWH TYPE	APPLICATION PROCESS	DEFINITION	ELIGIBILITY
Unitary Residential	Midstream Instant Rebate + Mail-In for Additional Costs	Heat pump water heater with a total nominal compressor output power of 6 kW or less , including integrated heat pumps with storage as shipped from the point of manufacture and split-system heat pumps that consist of a separate heat pump and storage tank that are designed and marketed to operate together.	NEEA Tier 3-compliant + JA13-compliant for load shifting adder
Unitary Commercial	Midstream Instant Rebate + Mail-In for Additional Costs	Heat pump water heater with a total nominal compressor output power greater than 6 kW with integrated storage as shipped from the point of manufacture, including skid systems that are pre-plumbed and wired.	ENERGY STAR-certified + Appendix A-compliant for load shifting adder
Central Residential	2-Step Reservation Process	Heat pump water heater(s) without integrated storage as shipped from the manufacturer, and designed for residential, single and multi-family applications.	Approval in CEC Title 24 CBECC software + Appendix A-compliant for load shifting adder
Central Commercial	2-Step Reservation Process	Heat pump water heater(s), without integrated storage as shipped from the manufacturer, and designed for commercial applications.	Approval in CEC Title 24 CBECC software + Appendix A-compliant for load shifting adder

Incentive Design Principles

1. Come in slightly below the conventional price for both product and installation to get customer attention and drive market transformation
2. Significant customer “co-pay” to stretch program funds to more units
3. Load shifting controls adder built into the retail price with incentive for load shifting
4. Avoid incentive to undersize, encourage right-sizing to maximize efficiency and flexibility benefit

Cost Case Studies

Total cost for each install will vary greatly based on:

- Product Cost (size and equipment type)
- Load Shifting Product Cost (hardware/software)
- Installation Cost (basic install/wiring/ducting)
- Energy Source Conversion Cost (panel upgrade)

Unitary Residential – Cost Samples

50 gallons	Description	Cost No load shifting	Cost with load shifting
Unit		\$1,100	\$1,500
Wiring	From unit to panel	\$300-\$1,000	\$300-\$1,000
Other installation labor (plumbing)		\$700-\$1,000	\$700-\$1,000
Panel upgrade		\$3,000-\$4,000	\$3,000-\$4,000
Total pre-incentive	Unit price	\$1,100	\$1,500
	Installed cost (w/o panel)	\$2,100-\$3,100	\$2,500-\$3,500
	Installed cost (w/ panel)	\$5,100-\$7,100	\$5,500-\$7,500
Incentive	Base incentive	\$800	\$800
	Load shifting adder		\$400
	Installation	up to \$800	up to \$800
	Panel upgrade	\$2,500	\$2,500
	Max	\$1,600-\$4,100	\$2,000-\$4,500
Total Cost to Customer	Retail price	\$300	\$300
	Installed cost (w/o panel)	\$500-\$1,500	\$500-\$1,500
	Installed cost (w/ panel)	\$1,000-3,000	\$1,000-3,000

Unitary Residential – Cost Samples

80 gallons	Description	Cost No load shifting	Cost with load shifting
Unit		\$1,900	\$2,300
Wiring	From unit to panel	\$300-\$1,000	\$300-\$1,000
Other installation labor (plumbing)		\$700-\$1,000	\$700-\$1,000
Panel upgrade		\$3,000-\$4,000	\$3,000-\$4,000
Total pre-incentive	Unit price Installed cost (w/o panel) Installed cost (w/ panel)	\$1,900 \$2,900-\$3,900 \$5,900-\$7,900	\$2,300 \$3,300-\$4,300 \$6,300-\$8,300
Incentive	Base incentive Load shifting adder Installation Panel upgrade Max	\$1,600 up to \$800 \$2,500 \$2,400-\$4,900	\$1,600 \$400 up to \$800 \$2,500 \$2,800-\$5,000 (cap)
Total Cost to Customer	Retail price Installed cost (w/o panel) Installed cost (w/ panel)	\$300 \$500-\$1,500 \$1,000-3,000	\$300 \$500-\$1,500 \$1,300-3,300

Proposed HPWH Incentives

HPWH TYPE	BASE REBATE	LOAD SHIFTING CAPABILITY ADDER	ADDITIONAL ELIGIBLE PROJECT COSTS	TOTAL PROJECT CAP
Unitary Residential	≤ 45 gal: \$700 >45-55 gal: \$800 >55-75 gal: \$1,200 >75 gal: \$1,600	\$400	Installation: up to \$800 (itemized) Panel: \$2,500	\$2,500 / installed HPWH (w/o panel) \$5,000 / installed HPWH (w/ panel)
Unitary Commercial	\$300 / kW* (e.g. \$3,000 for a 10-kW system)	\$100 / kW (\$1,000 / 10 kW)	Installation: up to \$150 / kW (itemized) (\$1,500 / 10 kW) Panel: \$2,500	\$30,000 / installed HPWH
Central Residential	\$800 / kW (e.g. \$52,000 for a 50-unit project)	\$400 / kW (e.g. \$26,000 for a 50-unit project)	Installation: up to \$700 / kW (itemized) (e.g. \$45,000 for a 50-unit system) Panel: \$0	Apartment cap: \$1,900 / kW Project / reservation cap: no project can exceed (regardless of # of apartments): \$200,000
Central Commercial	Same as Central Res	Same as Central Res	Same as Central Res	Project / reservation cap: no project can exceed: \$200,000

* Total nominal compressor output capacity

Appendix A: Qualification Requirements for HPWHs – Requirements

Complement to Joint Appendix 13 (“JA13”) for commercial and central HPWH

Leverages JA13 with adjustments for commercial and central HPWH specifics

Appendix A: Qualification Requirements for HPWHs – Requirements

To qualify as a demand management heat pump water heater for the purposes of SGIP rebate eligibility, the following requirements must be met:

1. Safety Requirements
- 2. Minimum Thermal Storage Requirements**
3. Control Requirements for Demand Management and Local Time-of-Use
- 4. Load shifting performance requirements**
5. Non-standard mode exception
6. Local time management
7. Override and permanent disabling
8. User interface
9. Measurement and validation

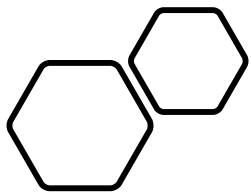
2. Minimum Thermal Storage Requirements

Unitary Residential (JA13, for reference)	Unitary Commercial	Central Residential	Central Commercial
Comply with First Hour Rating (FHR) in 2018 Uniform Plumbing Code (UPC)	Must have a minimum hot water delivery of 300 gallons per day	<p>Must have a minimum 0.84 kWh thermal storage per person based on design occupancy of the project described in the SGIP rebate application.</p> <p>The sizing calculation is based on an ambient air temperature of 67.5 F and an inlet water temperature of 58 F</p>	Enough thermal storage to support a minimum 4 hours of compressor operation.

4. Load Shifting Requirements


For a heat pump water heating system sized per the minimum storage requirements in section 2, above, and with the set point from the point of manufacture, the System shall be able to shift:

	Unitary Residential (JA13, for reference)	Unitary Commercial	Central Residential	Central Commercial
Basic Load Up + Light Shed	A minimum of 0.5 kWh of electrical energy per event	A minimum of 1 kWh of electrical energy per 100 gallon storage per event	A minimum of 0.2 kWh of electrical energy per person per event (design occupancy)	4 hours minimum of compressor run time at nominal rated power (same 4 hours as thermal storage requirement, not additive)
Advanced Load Up + Light Shed	A minimum of 1 kWh of electrical energy per event, including at least 0.5 kWh on Advanced Load Up	A minimum of 2 kWh of electrical energy per 100 gallon storage per event.	A minimum of 0.4 kWh of electrical energy per person per event, including at least 0.2 kWh on Advanced Load Up (design occupancy)	



Questions?





Self-Generation Incentive Program

APPLICATION PROCESS OVERVIEW

Two-Step Application Process for Residential & Non-Residential Entities (<10kW)

1

RESERVATION REQUEST

- Completed RESERVATION REQUEST FORM submitted to PA with required attachments
- ONCE A PROJECT IS ASSIGNED FUNDING IN A GIVEN STEP, PA reviews Reservation Request documents. Once documentation has been approved and eligibility requirements have been met, a CONDITIONAL RESERVATION LETTER is issued.
- INCENTIVE CLAIM FORM (ICF) documents are due within 12 months of the Confirmed Reservation date.

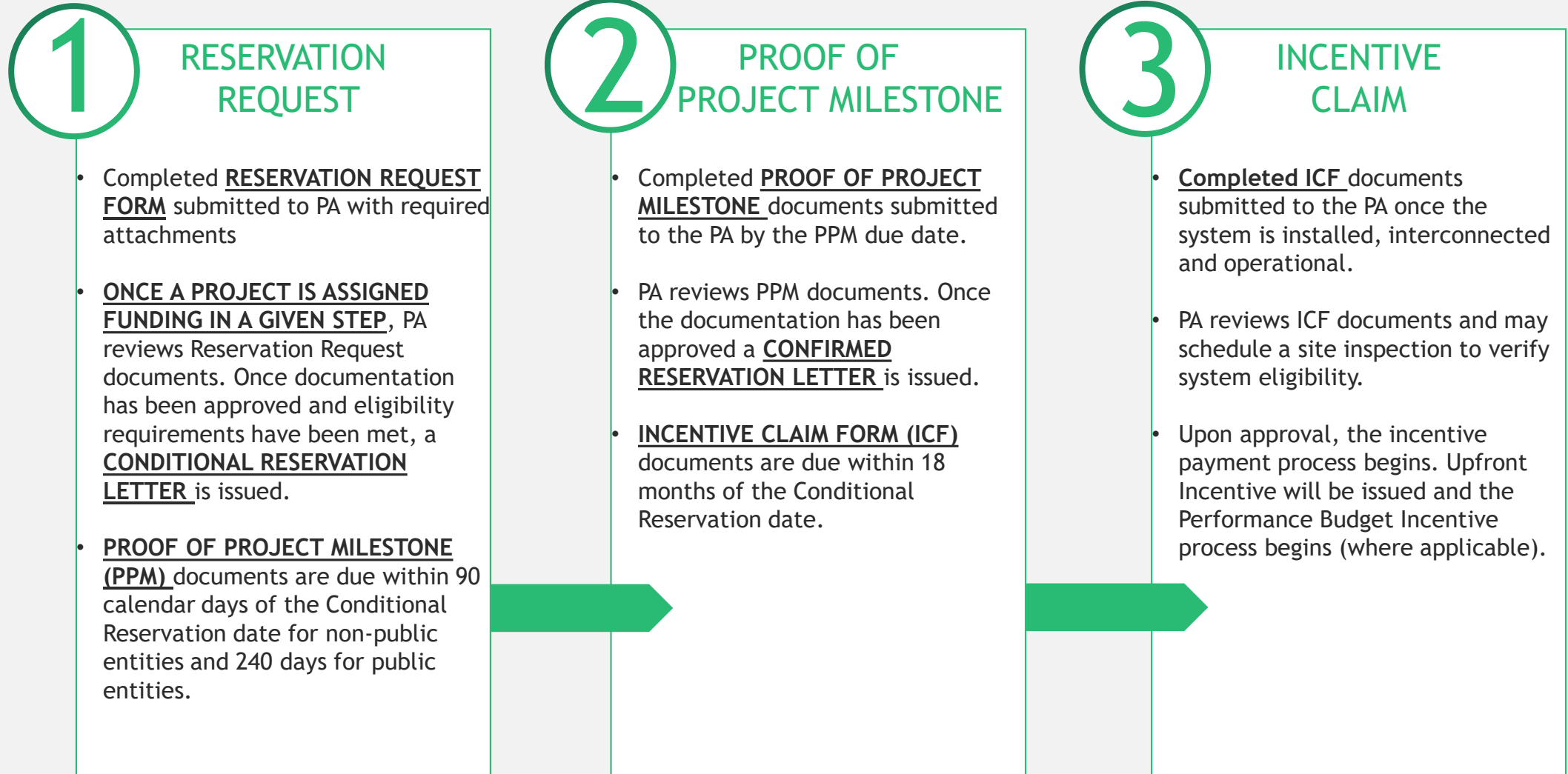
2

INCENTIVE CLAIM

- Completed ICF documents submitted to the PA once the system is installed, interconnected and operational.
- PA reviews ICF documents and may schedule a site inspection to verify system eligibility.
- Upon approval, the incentive payment process begins. Upfront Incentive will be issued and the Performance Budget Incentive process begins (where applicable).



Three-Step Application Process for Public & Non-Public Entities (10kW+)





Reservation Requests

Reservation Requests



2.3.1 Submission

- Complete package submitted online, not to exceed the Developer cap for the active step.

2.3.2 Lottery Process

- Lottery triggered if applications exceed available funds for a given budget / step and conducted separately for large scale, small residential and by territory.

2.3.2.1 Priority Projects

- Located in LADWP or West LA LCR of SCE, and those with on-site renewable generation claiming the ITC, charging a minimum of 75% from on-site renewable generator.
- In lottery, priority SGIP: 1) renewable projects using wind, waste to heat to power, pressure reduction turbines or

100% biogas; 2) 100% directed biogas; 3) Blended on-site biogas; 4) Blended directed biogas.

2.3.3 Pause Period

- No less than 20 days when a budget category changes to the next incentive step.
- After 10 days, Pas determine if the incentive level for storage technologies will increase from \$0.05./Wh to \$0.10./Wh.

2.3.4 Incomplete Reservation Request

- Applicants will have 15 calendar days to respond to PA with necessary information.

2.3.5 Approval

- Conditional Reservation for 3-Step Applications / Confirmed Reservation Letter for 2-Step Applications.

2.3.6 Wait List & Program Closure

- Once funds have been fully allocated, applications will be placed on a waitlist to be funded as incentive funds become available throughout the remainder of the program.



Proof of Project Milestone & Incentive Claim

Proof of Project Milestone



Incentive Claim



2.4.1 Submission

- Completed PPM submitted to PA online.

2.4.2 Incomplete PPMs

- If PPM package is not received by the due date, the application may be cancelled by the PA.
- Applicants have 15 days to respond with necessary information.

2.4.3 Approval

- A Confirmed Reservation Letter is issued once all PPMs requirements have been met.

2.5.1 Submission

- Completed ICF submitted to PA online.

2.5.2 Incomplete ICFs

- If complete ICF is not received by the reservation expire date, the application may be cancelled by the PA.
- Applicants have 30 calendar days to respond with necessary information.

2.5.3 Inspections

- PA may schedule inspection to verify system installation, operations, interconnection, and conformity to SGIP eligibility requirements.

Failed Inspections

- Notification to applicant, host customer & system owner of

reasoning for failed inspection; +60 calendar days to bring the project into compliance

- If the site load, renewable fuel or waste energy forecast has not yet materialized:
 - Payment issued based on demonstrated side load, renewable fuel or waste energy available at the time of initial post-installation inspection; or
 - Wait for the site load, renewable fuel or waste energy to materialize within 12-months from the date of the ICF & documents were received.

2.5.4 Approval

- Approval received with approved IC documentation & inspection



Modifications & Extensions

Modifications & Extensions



2.6.1 Modifications Pre-ICF

- Changes pertaining to System Owner, Payee, equipment type or system capacity must be approved by PA before application can proceed.

2.6.2 Modifications Post-ICF

- In general, changes to completed project are not allowed. If the event that a system needs to be upgraded / changed due to poor performance, applicant must notify PA.

2.6.3. Extensions & Exceptions

- Extensions reviewed on case-by-case basis after submitted in writing to the PA. Extensions cannot exceed reservation expire date.
- Projects are limited to a maximum of three 6-month extensions.

4 Classifications of HWPH Systems



Classifications of HWPB Systems

APP. PROCESS	HPWH TYPE	DEFINITION	ELIGIBILITY
Midstream Instant Rebate + Online Submission for Additional Costs	Unitary Residential	Heat pump water heater with a total nominal compressor output power of 6 kW or less, including integrated heat pumps with storage as shipped from the point of manufacture and split-system heat pumps that consist of a separate heat pump and storage tank that are designed and marketed to operate together.	NEEA Tier 3 compliant + JA13- compliant for load shifting adder
Midstream Instant Rebate + Online Submission for Additional Costs	Unitary Commercial	Heat pump water heater with a total nominal compressor output power greater than 6 kW with integrated storage as shipped from the point of manufacture, including skid systems that are pre-plumbed and wired.	ENERGY STAR CERTIFIED + Appendix A compliant for load shifting adder
2-Step Reservation Process	Central Residential	Heat pump water heater(s) without integrated storage as shipped from the manufacturer, and designed for residential, single and multi-family applications.	Approval in CEC Title 24 CBECC software + Appendix A compliant for load shifting adder
2-Step Reservation Process	Central Commercial	Heat pump water heater(s), without integrated storage as shipped from the manufacturer, and designed for commercial applications.	Approval in CEC Title 24 CBECC software + Appendix A for load shifting adder

New Process for Unitary (Residential and Commercial) HPWH Instant Midstream Rebate

1

RECEIVING OF INITIAL REBATE

- Customer, distributor or contractor to login into new page in SGIP.
- Once there, they select which IOU they are a customer of and enter installation address. They also select the water heater model they are purchasing to determine their incentive level (model type will impact whether they receive DR adder).
- They then sign the equivalent of a “host customer contract” that obligates them to agreed upon terms and conditions, confirms they are not receiving other HPWH monies, etc. Note: If the “host customer” is not purchasing the equipment, they have 30 days to e-sign.

- Once submitted, this is cross referenced instantly with funds in SGIP system and if funds are available, a coupon is issued.
- Once information is entered and validated, purchaser instantly receives an SGIP Project ID and a “rebate coupon”.
- They take this coupon to the register where it is scanned and linked to a specific HPWH (by serial number). The seller now has a reserved rebate that is earmarked and cross referenced with HPWH serial number and SGIP project ID.

2

ADDITIONAL ELIGIBLE PROJECT COSTS

- All HPWH projects shall be eligible for additional project costs to include: labor, panel upgrades, wiring, supply and return plumbing, electrical components, expansion tanks, code required upgrades and construction costs.
- These costs will be capped.
- Upon installation of HPWH and completion of work eligible for additional costs, lead applicant will enter proof of work in the SGIP system, using the unique SGIP ID and customer address. This will be reviewed by SGIP and a check will be sent within 30 days.

Process for Central (Residential and Commercial) HPWHs

1

RESERVATION REQUEST

- Completed RESERVATION REQUEST FORM submitted to PA with required attachments
- ONCE A PROJECT IS ASSIGNED FUNDING IN A GIVEN STEP, PA reviews Reservation Request documents. Once documentation has been approved and eligibility requirements have been met, a CONDITIONAL RESERVATION LETTER is issued.
- PROOF OF PROJECT MILESTONE (PPM) documents are due within 90 calendar days of the Conditional Reservation date for non-public entities and 240 days for public entities.

2

PROOF OF PROJECT MILESTONE

- Completed PROOF OF PROJECT MILESTONE documents submitted to the PA by the PPM due date.
- PA reviews PPM documents. Once the documentation has been approved a CONFIRMED RESERVATION LETTER is issued.
- INCENTIVE CLAIM FORM (ICF) documents are due within 18 months of the Conditional Reservation date.

3

INCENTIVE CLAIM

- Completed ICF documents submitted to the PA once the system is installed, interconnected and operational.
- PA reviews ICF documents and may schedule a site inspection to verify system eligibility.
- Upon approval, the incentive payment process begins. Upfront Incentive will be issued and the Performance Budget Incentive process begins (where applicable).

HEAT PUMP WATER HEATERS

- While details still need to be worked out we are proposing that the process for central projects mirror the existing SGIP process as closely as reasonable.

A satellite view of Earth at night, showing city lights and cloud patterns. A large green rectangular overlay covers the left and center portions of the image.

Questions?

HPWH APPLICATION PROCESS OVERVIEW

Heat Pump Water Heater Application and Incentive Calculation Process

Presenters: Jason Legner & Blaine Waymire

SoCalGas

HPWH Value Stacking

“We are aware that energy efficiency or other programs offer and may expand incentives for HPWHs but observe that SGIP is concerned with load-shifting and other storage technology services, not energy efficiency.”

- Page 98 D.19-09-027- Decision Establishing Equity Resiliency budget

- Multiple EE programs are offering upstream and midstream incentives (rebates, discounts, etc.) for HPWHs
- Leveraging other programs will help maximize ratepayer value
- SGIP eligible HPWHs should receive incentives for their ability to operate as an energy storage system
- Market transformation will require quick access to incentives and value stacking

“Quick Access”

Residential System Applications

- Conditional incentive reservation can be issued at site upon customer verification, proof of purchase or purchase order (no payment required), and electronic signature (will require database upgrades)
- Upon installation an online incentive claim request to be submitted with the following information:
 - Contractor/Installer Licensing
 - *Permit (if necessary)*
 - Total Eligible Project Cost information
 - Confirmation of **technology with JA13** (where applicable)
 - Payee Information
 - *Verification of installation (if necessary)*
- E-Signatures
 - Will agree to all program T&Cs (10 year warranty language, M&E participation, and other legalese)
- Payment can be generated within (?) days of confirmed installation
- Commercial Systems to follow current Application and PBI protocol

Incentives Calculated on an Energy Basis (kWh)*

- For illustration purposed examples are using existing Energy Storage rates:
- General Market: \$0.25/Wh
- Equity: \$0.85/Wh
- Potential Control Adder:\$0.25/Wh
- Example: 65 Gallon HPWH at 130 F Set Point:
- Load shift = 3.7 kWh
- SGIP Incentive General Market:
 - $3.7 \text{ kWh} * \$(250+250)/\text{kWh} = \$1,850$
- SGIP Incentive Equity Budget:
 - $3.7 \text{ kWh} * \$(850+250)/\text{kWh} = \$4,070$

		Tank volume (gal)			
		5	50	65	80
Set point (F)	120		2.4	3.2	3.9
	130		2.9	3.7	4.6
	140		3.3	4.2	5.2
	150		3.7	4.8	5.9

*PUC § 379.6(l)(3)

Equipment	Size and Cost	SGIP Incentive Rate per kWh	Total (General Market)	Total (Equity Budget)
Equipment (no load shifting controls, retail)*	50-gallon: \$1,100 to \$1,300 65-gallon: \$1,600 to \$1,800 80-gallon: \$1,800 to \$2,000	General Market HPWH \$0.25 Equity HPWH \$0.85	GM @ Set point of 120 - 150 (F) 50 - \$600 - \$925 65 - \$800 - \$1,600 80 - \$975 - \$1,475	Equity @ Set point of 120-150 (F) 50 - \$2,040 - \$2,890 65 - \$2,720 - \$4,080 80 - \$3,315 - \$5,015
Load shifting incremental costs*		HPWH w/controls \$0.25	Load Shifting Control Adder (120 – 150 F)	Load Shifting Control Adder (120 – 150 F)
HPWH controls (not available on market yet, estimated)	\$ \$? \$200-\$300		50 - \$600 - \$925 65 - \$800 - \$1,200	50 - \$600 - \$925 65 - \$800 - \$1,200
Mixing valve (equipment + installation)			80 - \$975 - \$1,475	80 - \$975 - \$1,475
Additional storage volume	\$200-500			
Installation*	\$800+			
Equipment Cost + Installation Totals:	Equipment Cost + Installation Totals: 50 - \$2,700 - \$2,900 65 - \$3,200 - \$3,400 80 - \$3,400 - \$3,600		Total Possible Incentive: 50 - \$1,200 - \$1,850 (45 - 64%) 65 - \$1,600 - \$2,800 (50 - 82%) 80 - \$1,950 - \$2,950 (57 - 81%)	Equity 50 - \$2,640 - \$3,815 (98 – 132%) 65 - \$3,520 - \$5,280 (103 - 155%) 80 - \$4,290 - \$6,490 (126 – 180%)
Additional project costs*			For equity customers only including electrical upgrades into TEPC will allow them to obtain the total incentive up to 180% of the total costs	
• Electrical conduit	\$500-\$1,000			
• Electrical panel upgrade	\$3,000-\$4,000			
• Vents and ducts	\$200-\$500			
Total Equipment Costs + Installation + Electrical Upgrades:	50 - \$6,400 - \$8,400 65 - \$7,000 - \$8,900 80 - \$7,200 - \$9,100			Equity 50 - \$2,640 - \$3,815 (41 – 45%) 65 - \$3,520 - \$5,280 (50 – 59%) 80 - \$4,290 - \$6,490 (59 – 71%)
*all costs provided by NRDC to HPWH working group on 3/16/2020				

Existing Measurement and Evaluation

- Residential HPWH will be measured on a fleet level for 10 years, and will follow existing protocol as residential batteries
 - Metering to be completed on a sample basis by Itron
- Non-Residential HPWH will be measured by PBI performance on a project by project basis for year 1 – 5 and Fleet Performance for Years 6 – 10
 - PBI Metering to be used for all 10-year reporting

Appendix

- EE HPWH Programs:
- SDG&E - \$100 to \$350 rebate
 - <https://www.sdge.com/sites/default/files/documents/Heat%20pump%20water%20heaters.pdf>
 - <http://www.sdgenews.com/article/deal-alert-350-rebate-high-efficiency-electric-heat-pump-water-heating>
- SCE – up to \$1000 upstream incentive
 - <https://www.sce.com/residential/rebates-savings/rebates>
- PGE - \$300 rebate
 - https://www.pge.com/pge_global/common/pdfs/save-energy-money/savings-solutions-and-rebates/rebates-by-product/ee_residential_rebate_catalog.pdf
- Building Decarbonization Program:
 - <http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M326/K933/326933578.PDF>



Self-Generation Incentive Program (SGIP) Heat Pump Water Heater (HPWH)

Q&A Open Discussion

